Chapter 2 — Public Participation, Issue Identification, and Alternatives

This chapter covers five primary topics. First, it describes the opportunities for public participation and the process used to obtain the public's input. Then, it describes the process used to develop the alternatives that were considered in this analysis. Third, it describes the alternatives that were analyzed in detail. The specific features of these alternatives are fully described. Fourth, it identifies each alternative eliminated from detailed consideration and briefly describes the rationale for the exclusion. Finally, it summarily presents, in comparative form, the components and environmental effects of the alternatives analyzed in detail and will identify the agencies' preferred alternative.

Public Participation

Public participation is a crucial component of the NEPA process overall. However, it is especially important and valuable at two particular points in the process: defining the scope of the NEPA analysis (scoping) and reviewing and commenting on the draft EIS. Both of these points are discussed below.

Scoping

Formal scoping for the NEPA analysis of the proposal began on November 7, 2003 with the publication of the Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. The NOI was published to inform readers of the BIA's intent to conduct an environmental analysis of the MHA Nation's proposal (Bureau of Indian Affairs 2003). The notice also solicited comments to assist the BIA in identifying the issues and concerns that should be addressed in the analysis and documented in the EIS. The comment period ran from November 7 to December 8, 2003.

Before BIA published its NOI, the MHA Nation held a series of informational meetings at community centers around the Reservation to describe its proposal and answer questions. The six meetings, which were on successive evenings during September 2003, were not scoping meetings. The overall goal of the meetings was to provide members of the MHA Nation and others the opportunity to learn about the proposed refinery and the NEPA process. Consequently, the meetings included a presentation on the proposed refinery and a description of the NEPA process that will culminate in the EIS and RODs. The presenters also answered questions after the presentations. Finally, comment forms were distributed to facilitate the submittal of written comments and concerns.

The number of people that attended the meetings varied. A range of people (10 to 30 people) attended each of the meetings held in Makoti, White Shield, Parshall, and New Town. In contrast, the meetings in Mandaree and Twin Buttes were only sparsely attended with at most three people attending.

BIA released a Draft Scoping Report for public review on October 1, 2004 and accepted comments on the report until November 18, 2004. The report summarized the scoping efforts conducted through September 2004 and the concerns and issues previously identified. On November 9, 2004, EPA conducted a public hearing on the issues identified in the draft report. Eighty-seven people attended the hearing. The Final Scoping Report incorporates comments submitted on the Draft Scoping Report.

Review of the Draft EIS

CEQ, BIA, and EPA's NEPA directives require the agencies to make this draft EIS available to the public for review. This review provides the public with an opportunity to comment on the content of the document, which could affect the final EIS and agency RODs. Furthermore, BIA and EPA are required to respond in the final EIS to all substantive comments submitted on the draft EIS. To comment most effectively, the public should focus comments on (1) any new information about the area or impacts; 2) why or how analysis or assumptions are flawed; (3) errors in data, sources, or methods; or (4) clarifications of the assessment that bear on conclusions.

Process Used to Develop Alternatives

The process of developing alternatives to the proposed project action involved five steps. First, the agencies conducted scoping to identify the key issues of concern, which would define the scope of the impact assessment. The scoping involved concerns that were both internal to the agencies and that were raised by the public. It also considered environmental and project-design elements.

The second step consisted of formulating alternatives to the acceptance of land into trust in support of the proposed refinery. Each alternative had to meet the purpose and need for the project. Typically, at this stage, issues are identified by the agencies to help define the changes that are needed to avoid, eliminate, reduce, minimize, or mitigate effects that would result from implementing the proposed project action.

The third step consisted of developing alternatives for the discharge of effluent from the refinery. Each alternative had to meet the purpose of and need for the project and each alternative had to be likely to continuously achieve compliance with environmental laws such as the CWA, SDWA and RCRA. The primary driving issue for these alternatives is protecting water quality.

The fourth step involved screening the potential alternatives for reasonableness. The NEPA process requires that alternatives evaluated in detail be reasonable. The regulations for implementing NEPA discuss the need for reasonable alternatives in the NEPA process (40 CFR 1500.2(e) and 1502.14). In addition, CEQ's *40 Most Asked Questions about NEPA* (Question 2a) state, in part, that "reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense" (Council on Environmental Quality 1981).

Based on this direction, the agencies focused the screening of alternatives on technical, environmental, and economic feasibility. Technical considerations included the feasibility of constructing and operating the facilities. Environmental considerations included the potential for significant effects and the feasibility of successfully mitigating them. Economic considerations included potential costs and benefits of implementing the alternative.

Finally, unreasonable alternatives were eliminated from detailed consideration. If an alternative did not pass the technical, environmental, and economic screening for feasibility, it was not considered for further analysis.

Alternatives Considered in the NEPA Analysis

The process described above resulted in the development of alternatives that specifically responded to one or more of the key issues. Although a variety of alternatives was developed, not all were analyzed in detail. Some were deemed unreasonable during the feasibility screening. Others were eliminated after initial analysis indicated they were not reasonable or that conditions had changed. Consequently, the alternatives are described in two overall sections. The alternatives analyzed in detail are described first. A section on Alternatives Considered but Eliminated from Detailed Analysis follows the alternatives analyzed in detail.

Alternatives Analyzed in Detail

Five alternatives for BIA's decision on acceptance of the land into trust status and four effluent discharge alternatives were analyzed in detail. The project alternatives for BIA include the proposed project action (Alternative 1), three modified action alternatives (Alternatives 2, 3, and 4), and the no action alternative (Alternative 5). Under Alternative 2, BIA would accept the 469-acre parcel into trust, but it would not approve MHA Nation's proposal to construct, operate, and maintain a grassroots, clean fuels refinery on the parcel. Under Alternative 3, BIA would not accept the 469 acres into trust status. However, the MHA Nation would construct the clean fuels refinery as described (under Alternative 1) with applicable permitting from EPA. Under Alternative 4 (the modified proposed project), the Refinery facilities would be configured to move most of the project facilities out of the wetland and to replace the effluent wastewater treatment ponds with a tank system. Lastly, Alternative 5 is the No Action Alternative.

The four effluent discharge alternatives for EPA include: A) the proposed project action involving effluent discharge through an NPDES permit B) partial effluent discharge through an NPDES permit and some storage and irrigation, C) effluent discharge to an Underground Injection Control (UIC) Class I well, and D) no action. All of the EPA effluent discharge alternatives apply to the BIA project alternatives that include building the refinery. All of these alternatives are described in detail in the following sections.

Several terms are used throughout this EIS to identify the 469-acre parcel, parts of the parcel, or areas surrounding the parcel that are the focus of the action alternatives. "Project site" refers to the entire 469-acre parcel. "Refinery site" refers to the 190-acre portion of the project site where the refinery would be constructed. The "analysis area" encompasses the project site and the corridors connecting the oil, natural gas, and water pipelines and power lines to the refinery site. Figure 2-1 shows the area surrounding the refinery site, utility corridors, and proposed utility lines.

Alternative 1 — Original Proposed Project Action

The proposed project action is to accept the 469-acre project site into trust; construct and operate a grassroots, clean fuels refinery on 190 acres of the project site; and produce forage for MHA Nation's buffalo on the other 279 acres. The following sections describe the process and analysis MHA Nation used to develop the proposed project action and the details of this alternative. EPA will consider all of the effluent discharge alternatives for this proposed project action.

Development of the Proposed Project Action

The MHA Nation's development of the proposed project action began with a search of the Reservation for sites that would be potentially suitable for constructing, operating, and maintaining a clean fuels refinery. The search was conducted using an initial set of screening criteria (Triad Project Corporation 2003a). These criteria included:

- The site must be relatively flat,
- The site must encompass a minimum of 160 acres (at least 320 acres was preferred),
- The site must be close to a railroad (the existing rail line runs from Makoti, through Parshall to New Town.),
- The site must have proximate access to an all-weather state highway, and
- The spur from the railroad into the site must be minimal and not cross any roads.

Using these initial screening criteria, eight potentially suitable sites were identified in the vicinity of the existing railroad corridor and Highway 23.

The eight potentially suitable sites were then evaluated and ranked using the following criteria:

- Ownership of the property (Is the site: within the reservation, tribally owned, held in trust or can the site be accepted into trust?) with tribal land and land within the reservation getting the highest points,
- Suitable topography (can the site be easily graded/configured to enhance operation of the refinery) with a relatively flat site getting the highest points,
- Potential for effects to surface water, watershed, and wetlands with no impacts getting the highest points,
- Potential for effects to communities (an adequate population base must be nearby to supply the work force, however, the refinery should not be located too close to communities) with no impacts getting the highest points,
- Proximity to the existing pipeline was considered with more points attributed for close proximity to the line,
- Proximity to an existing highway was considered with more points attributed for close proximity to the highway,
- Proximity to an existing railroad was considered with more points attributed for close proximity to the railroad and switch yard,
- Proximity to oil industry facilities was considered with more points attributed for close proximity to existing facilities,
- Value of the site as farmland or wetlands was considered with points attributed for soil type and existence of wetlands, and

Figure 2-1 Project Area Overview

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- Visibility of the refinery from recreational areas, namely Lake Sakakawea, was considered with points attributed for visibility.

The final evaluation of the three sites with the highest scores involved a cost and safety analysis that included the following criteria:

- Seller willing to sell at a reasonable price within the budget,
- Cost of infrastructure in relation to each site (cost of constructing rail services, roads, surface drainage, utilities and overall facility),
- Safety factors relative to highway and railway traffic and any ongoing liability, which can be reduced or eliminated by site selection, and
- Ability to have the land acquired into trust status.

Using these criteria, the MHA Nation determined the project site parcel was the most suitable site and entered into negotiations with the landowners to purchase the properties. After buying the parcel and beginning work on a refinery design, the MHA Nation submitted a request to the BIA to accept the parcel into trust.

Refinery

Under this alternative, the MHA Nation would construct, operate, and maintain a grassroots, clean fuels refinery on the refinery site. Feedstock for the refinery would include 10,000 barrels per stream day (BPSD) of synthetic crude oil, 3,000 BPSD of field butane, 6 million standard cubic feet per day (MMSCFD) of natural gas, and 300 barrels of biodiesel or 8,500 bushels per day of soybeans. From the feedstock, the refinery would produce about 5,750 BPSD of diesel fuel, 6,770 BPSD of gasoline, and 300 BPSD of propane. With the planned maintenance program, the refinery would have an economic life well past 20 years. At the end of its economic life, MHA Nation would decommission and reclaim the facility.

Processes Comprising the Refinery

The refinery would consist of 14 plants. Each plant would handle a specific operation or portion of the overall refining process. Table 2-1 briefly summarizes the 14 plants. The following sections describe the functions of each of the 14 plants.

The numbering of the plants is for reference only and the numbers assigned to the various units and plants are meaningful only to the design engineers. Although gaps exist in the numbering of the 14 plants, all proposed plants are included in the description of the refinery and in the impact analysis. Engineering design convention is to leave gaps in numbers between major units to facilitate adjustments during the refinery's design and operation. The general layout of the refinery is depicted in Figure 2-2.

Unit A — Crude Processing

The Crude Processing Unit of the refinery would consist of the crude plant and a saturated gas plant. The crude plant would distill crude oil into various fractions that would be the feedstock for other plants. The saturated gas plant would receive gas that contains saturated hydrocarbons from the crude plant and other plants and strip those saturated hydrocarbons from the gas.

Table 2-1 Summary of Plants That Would Compose the Refinery

Unit	Description
Crude Processing	Takes the crude oil and separates it into component parts by a heating process called distillation.
Naphtha Hydrotreater	Removes sulfur from naphtha feedstock and reforms the desulfurized naphtha with hydrogen to produce a high-octane gasoline blending component.
Reformer	Reformate stream is collected and sent to storage as a gasoline blending component.
Hydroprocessor	Cracks hydrocarbons into smaller, lighter ones under high temperatures, high pressures, and a hydrogen atmosphere. Produces light and heavy ultra-low sulfur diesel fuels.
Treating	Removes sulfur compounds from various water and gas streams and converts the removed material into elemental sulfur.
Butane Isomerization	Processes normal butane into isobutane. The isobutane is isolated in the DIB overhead and fed to the Olefin Unit.
Olefin	Converts isobutane to isobutylene as part of the process to produce iso-octane.
Iso-octane	The process dimerizes isobutylene (from the Olefin Unit) into iso-octene. Then the iso-octene is saturated with hydrogen in a separate reactor to produce iso-octane, a very clean high octane gasoline blending component.
Hydrogen	Produces the hydrogen needed for other refinery units.
Utilities	Composed of the fuel gas, flare, instrument and utility air, fire water, boiler feed water, and nitrogen systems.
Water Treatment	Process raw water from wells to treated water and treats wastewater.
Storage, Blending, and Shipping	Includes tanks for storing products, pumps for blending products, and facilities for loading railcars and trucks.
Bio-diesel	Processes oil from soybeans into bio-diesel (methyl esters).
General Refinery	Consists of off-sites, office/warehouse, and general offices.

Source: Triad Project Corporation 2003b, Woolley 2004a, Woolley 2006

Plant 01— No. 01 Crude

The crude plant would be the first step in the refining process (Figure 2-2). In the crude plant, crude oil would go through a series of steps where it is heated, vaporized, fractionated, condensed, and cooled. Initially, the crude oil would be pumped through a series of heat exchangers that would increase its temperature. During this heating, some vaporization of the feed stream would occur, with fractions such as naphtha, light diesel, and heavy diesel being vaporized and sent directly to the atmospheric crude column

Figure 2-2 Schematic of Refinery Units

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(fractionating column). The crude stream from the exchangers that was not vaporized in the exchangers would be sent to the atmospheric crude heater and heated to specific temperatures and then sent to the fractionating column. This column would separate the crude oil into different fractions based on their boiling range fractions or "cuts." Additional stripping would occur in stripper columns downstream of the fractionator. The fractions from the fractionator and strippers may be recycled for additional treatment or sent directly to finished product blending or to other downstream plants, such as the saturated gas plant, for further processing.

Plant 02— Saturated Gas Plant

The saturated gas plant would receive wet gas from the crude plant and other process plants (for example, the reformer and hydroprocessor) that contains saturated hydrocarbons (for example, methane, ethane, propane, and butanes). Further treatment in the saturated gas plant would be necessary to remove these "light end" hydrocarbons that could not be separated in the atmospheric crude distillation or other units. A crude debutanizer column would be used to separate the butanes and propane from the naphtha, and a crude depropanizer column would be used to separate out propane. These separated light ends would be used for further product production or refining activities (for example, butane and propane to the amine plant and stabilized naphtha to the naphtha hydrotreater).

Unit B — Naphtha Hydrotreater

The naphtha hydrotreater (NHT) would be used to treat sulfur-containing naphtha that would be used subsequently as a feedstock to the catalytic reforming unit. Hydrotreating would be needed to remove components, such as sulfur, nitrogen, and metals, to protect the reformer catalyst and to meet air quality regulations for the use of low sulfur distillates and jet fuels.

Plant 05 — Naphtha Hydrotreater

The NHT would receive stabilized naphtha as feedstock from the saturated gas plant. The naphtha feedstock would be mixed with hydrogen and heated. The naphtha combined with hydrogen would then be sent to a vessel containing a catalyst. Several reactions would occur in the presence of the catalyst, including:

- Sulfur and nitrogen compounds would be converted to hydrogen sulfide (H_2S) and ammonia (NH_3);
- Metals that are present in the feed would be deposited on the catalyst;
- Some compounds such as naphthenes and aromatics, would become saturated with hydrogen and some cracking would occur, resulting in lighter components, such as methane, propane, and butanes.

The resulting treated naphtha stream (low-octane naphthas) from the NHT would be charged to the catalytic reformer for additional treatment. The catalytic reformer would convert low-octane naphthas into high-octane gasoline blending components called reformates.

Unit D — Reformer

The catalytic reformer is comprised of a reactor section and a product-recovery section; the basic units are a feed/effluent heat exchanger, 3 furnaces, 3 reactors, a regenerator, overhead recontacting section, net gas compressor, recycle gas, and a stabilizer column.

Plant 08 — Reformer

Desulfurized naphtha feed from the NHT would be mixed with hydrogen, heated, and discharged to the reformer unit. The mixture would then be passed through a series of fixed bed catalytic reactors, where higher-octane compounds, such as aromatics, are formed. The effluent from the final reactor would be cooled and pumped to a separator that would allow butanes and lighter components to be removed and recycled to the saturation gas plant. Liquid product from the bottom of the separator would be pumped to a fractionating column called a stabilizer (debutanizer). The resulting bottom reformate stream would then be collected and sent to storage as a gasoline blending component.

Unit F — Hydroprocessor

The Hydroprocessor Unit consists of the Hydroprocessor and Fractionation plants.

Plant 11 — Hydroprocessor

The hydroprocessor would use several technologies in an integrated process to upgrade distillate-range compounds to high-quality kerosene and diesel that would meet air quality requirements for sulfur, aromatics, and cetane number in vehicles. The hydroprocessing plant would perform three basic steps: hydrodesulfurization, hydrocracking, and fractionation.

The primary purpose of hydrodesulfurization would be to remove sulfur compounds and other impurities, such as nitrogen, oxygen, halides, and trace metals, that could negatively affect the catalysts used in other downstream refining processes. Hydrodesulfurization is a process that catalytically treats various hydrocarbon streams by reacting them with hydrogen in the presence of a catalyst.

Plant 12 — Fractionation

In hydrocracking, which is a combination of catalytic cracking and hydrogenation, heavier feedstock (gas, oil, and diesel) would be converted into lighter components in high-temperature, high-pressure reactors in the presence of hydrogen and a catalyst. The product stream from the reactors would then be sent to a fractionating column for further refinement. The primary fuels produced by this process would be ultra-low sulfur kerosene and diesel. In addition, some of the heavier naphtha streams would be sent as feedstock to the catalytic reformer for upgrading (increase octane), because these streams (heavy hydrocrackate) would have many aromatic precursors.

Unit H — Treating

Unit H would consist of six sections. They are the sour water stripper, amine plant, merox plant, contaminated water stripper, butane treater, and sulfur plant. Each unit is discussed below.

Plant 16 — Amine Plant

The purpose of the amine unit would be to remove hydrogen sulfide and carbon dioxide from various hydrocarbon gas streams referred to as sour gas streams. This is accomplished by absorption in an aqueous solution of diethanolamine (DEA).

In the amine plant, sour gas streams would undergo a multi-step process. Sour gas streams from refining processes (for example, hydroprocessor and saturation gas plant) would first enter a filter/coalescer vessel, where the separated liquid fraction would be pumped to the sour water stripper. The overhead gases would then pass through an absorber (amine contactor) where hydrogen sulfide would be removed. Sweetened fuel gas would be returned to the refinery fuel system.

The liquid bottoms would continue through further treatment in the amine plant. The liquid fraction containing hydrogen sulfide (rich DEA) would be stripped to separate the hydrogen sulfide as an acid gas stream. This stream would be sent to the sulfur plant for treatment. The stripped liquid solution (lean DEA) would be recycled in the process.

Plant 17 — Sulfur Plant

Air quality regulations require minimizing the amount of sulfur dioxide emissions to the atmosphere by end products. The main source of these emissions is from the burning of hydrocarbon streams containing hydrogen sulfide. Petroleum refining operations can remove hydrogen sulfide from end product fuel systems and convert the removed material to elemental sulfur.

The MHA Nation Refinery would use the most widely used sulfur recovery system — the "Claus" Process. This process consists of two basic phases: combustion and reaction. During the combustion phase, about one-third of the hydrogen sulfide in the feed gas to the unit would be burned in a furnace. This would form sulfur dioxide, water, and sulfur. In the reaction phase, the sulfur dioxide would be reacted in reactors with the remaining two-thirds unburned hydrogen sulfide over a catalyst to form sulfur.

Claus units typically convert 90 to 93 percent of the hydrogen sulfide to sulfur. The remaining hydrogen sulfide is referred to as the tail gas. This tail gas would be diverted to an incinerator for additional treatment. Exhaust from the incinerator would be discharged to the atmosphere via a tall sulfur stack.

The primary feed streams of the MHA Nation Refinery to the sulfur plant would be acid gases from the amine plant and the SWS. The resulting molten sulfur product would be sent to a sulfur pit. From the pit, the sulfur would be pumped to the loading facilities for shipment by truck. The sulfur would be sold and shipped to the buyers' locations.

Plant 18 — Sour Water Stripper

Sour water refers to various waters containing sulfides; however these waters typically also include ammonia and small quantities of phenol and other hydrocarbons. Sour water would be produced as a by-product of operations in several units, including the crude distillation unit, hydroprocessor unit, amine plant, merox plant, and sulfur plant. In addition, sour water may be generated when steam is condensed in the presence of gases containing hydrogen sulfide.

The sour water stripper (SWS) would be designed to remove hydrogen sulfide, ammonia, some phenolics, and other contaminants from the sour water stream. The feed streams to the SWS would first enter a sour water degasser vessel, where sour gas would be removed and pumped to the sulfur plant. The sour water would be directed to the sour water stripper column where sour gas would be diverted to the sulfur plant for processing. Stripped water would be diverted to a sour water storage tank. The water would then be recycled or pumped to the wastewater treatment unit (WWTU) for treatment.

Plant 19 — Contaminated Water Stripper

The purpose is to strip benzene and other VOCs from the contaminated waste water that has been in contact with the process and recycle them back to the process. The stripped waste water contains less than 0.005 ppmv of benzene, and is sent to the WWTU.

Plant 20 — Merox Plant

Non-hydrotreated fuels (sour stocks that contain sulfur compounds) would be sent to the merox plant to remove sulfur compounds. This "sweetening" process would remove sulfur compounds (primarily hydrogen sulfide) and mercaptans (thiols) to improve odor, color, and oxidation stability and to comply with applicable air quality regulations for the fuels' use. The process would use both extraction and conversion steps using caustic and a dissolved catalyst for the reactions.

The feed streams (mixed butanes and propane from the saturation gas plant) would first enter a separate extractor vessel and would be contacted with recycled, regenerated caustic solution. The treated butane stream would be pumped through to a knockout drum and a sand filter and then on to the iso-octane unit. The propane stream would flow to a knockout drum, sand filter, and propane dryers and then would be sent to propane storage. Sour water generated in the process would be pumped to the sour water stripper. Acid gas would be sent to the sulfur plant.

The caustic solution from the extractors that contain dissolved mercaptans would be sent to oxidizers. Here, the mercaptans would be oxidized to disulfides and the caustic would be restored. The stream would then be sent to the disulfide separator where the excess air/disulfides mixture would be separated and sent to the flare. The caustic solution would be recycled to the extractor.

Plant 21 — Butane Treater

Field butanes are imported as feedstock for the production of iso-octane for gasoline. The field butanes are about 70% normal butane and 30% iso-octanes, and must be treated for sulfur removal with hydrogen and catalyst. The treated butane mixture is then sent to the DIB for separation by fractionation.

Unit J — Butane Isomerization

The Butane Isomerization Unit consists of the Deisobutanizer, Butane Isomerization, and Caustic Treater.

Plant 25 — Deisobutanizer

This unit is the initial step in the process of producing iso-octane.

Field butanes would be pumped from the storage vessels in the tank farm to the feed preparation described in Plant 21. The field butanes would then be desulfurized.

Once desulfurized, the field butanes would be charged to the DIB (fractionation column). The DIB would separate isobutane (iC4), normal butane (nC4), and pentanes (C5+). The isobutane would be charged to the olefin unit (Unit K) for processing. The normal butane would be charged to the butane isomerization unit (Plant 26) to convert it to isobutane.

Plant 26 — Butane Isomerization

In the butane isomerization plant, normal butane would be processed to produce isobutane, the key feedstock for the iso-octane (iC8) unit. The mixed butanes from the Isomerization unit (about 52% conversion to isobutane) would be returned to the DIB column to separate the isobutane and normal butane. The normal butane coming from the DIB column side draw would be directed to the Isomerization unit. In the presence of the catalyst, normal butane would be converted to isobutene. The isobutane manufactured in the Isomerization unit along with the isobutane in the field butanes fresh feed is all recovered in the DIB and sent overhead as feed to the Olefin unit (Unit K).

Plant 27 — Caustic Treater

The normal butane product must be treated with caustic solution to remove any sulfur compounds.

Unit K — Olefin

The butane dehydrogenation plant would employ catalytic dehydrogenation technology to convert isobutane (iC4) to isobutylene (iC4=).

Plant 29 – Olefin

The process would be composed of three sections: a reactor section, a product recovery section, and a catalyst regeneration section. In the reactor section, isobutane feed from the DIB overhead would flow through a series of reactors. The platinum catalyst in these reactors would promote a dehydrogenation reaction. The reactant effluent from this reaction process would then be sent to the product recovery section, where the effluent would be cooled, compressed, dried, and sent to a cryogenic system to separate hydrogen from hydrocarbon. The separator liquid product, isobutylene, would be sent to the iso-octane unit as a feedstock. Unconverted gases are sent to the pressure swing adsorption (PSA) unit for production of pure hydrogen. The PSA unit is discussed in the section on Unit P – Hydrogen.

Unit M — Iso-octane

This plant would produce iso-octane, which is a very clean (no sulfur or aromatics), high-octane gasoline (100 octane (R+M/20)). The iso-octane would be used as a blending component for gasoline. Processing of isobutene in the iso-octane plant would involve two primary phases: dimerization and hydrogenation.

Plant 31 – Dimerization

In the dimerization phase, molecules of isobutylene (iC4=) from the olefin unit (Unit K) would be combined into molecules of iso-octene (iC8=). Dimerization would involve feeding the isobutylene through a series of exchangers, reactors, column reboilers, and column condensers. The resulting iso-octene would be charged to the hydrogenation plant.

Plant 32 – Alcohol Extraction

In the dimerization reactors water is present and combines with isobutylene to form tertiary butyl alcohol (TBA) that is beneficial to the reaction. However, the amount of TBA in the system is controlled by this unit, recycling the required amount to the reactors, and yielding the excess.

Plant 33 – Hydrogenation

In the hydrogenation phase, the iso-octene would be saturated with hydrogen under low pressure to produce iso-octane. The primary components of the hydrogenation unit would be the saturation reactor and product stripper. The hydrogen used in the process would come from the hydrogen plant (Unit P). From the product stripper, the iso-octane would be sent to storage for use as a blending component for gasoline.

Unit P — Hydrogen

A significant amount of hydrogen would be required for operating specific refining processes, such as the hydroprocessor. Although some hydrogen would be produced within refinery operations such as catalytic reforming, the supply would not be sufficient to meet the needs of the refinery's operations. Therefore, the MHA Nation Refinery would use a steam-methane reforming (SMR) plant and a Pressure Swing Adsorption (PSA) plant to produce the additional amount of hydrogen required for operations.

Plant 36 – Steam Methane Reformer

The SMR unit would accomplish the following basic steps:

- **Sulfur Removal** — the feed streams (fuel gas, natural gas, and boiler feedwater [BFW]) to the SMR would first be pretreated in a hydrogenation reactor vessel to convert any sulfur compounds to hydrogen sulfide. The feed from the hydrogenation vessel would then flow through vessels containing zinc oxide to remove any hydrogen sulfide.
- **Reforming** — following removal of sulfur compounds, the gas stream would be mixed with steam in a reformer furnace and undergo a catalytic reaction that produces carbon monoxide and hydrogen.
- **Shift Conversion** — the carbon monoxide from the reformer would then be reacted in the presence of a catalyst and additional steam to produce hydrogen and carbon dioxide. About 92 percent of the carbon monoxide would be converted into hydrogen.

Plant 37 – Pressure Swing Adsorption

To produce a more pure hydrogen stream, the hydrogen stream from the SMR would be sent to the PSA. The PSA would adsorb impurities from the hydrogen-rich stream by using a fixed bed of adsorbents operating at high pressure. This can result in purity in excess of 99.9 percent. The high purity hydrogen will supply the refinery's need for desulfurization. The PSA tail gas is available at low pressure, so will be used in the nearby SMR furnace as fuel.

Unit R — Utilities

The utilities unit would consist of almost a dozen systems. These systems include the fuel gas system, the flare system, the instrument/utility air system, the fire water system, the boiler feed water system, the emergency power and the nitrogen system.

Plant 40 — Boiler Feedwater System

Refinery operations require steam, which would be supplied by the boiler feedwater system. The boiler feedwater system would include three steam generator boilers to provide the required steam. Feeds to the unit would consist of recycled treated water from the water treatment unit (unit 36), condensate from steam condensate recovery, and recycled low-pressure steam. The steam generators would be fueled with fuel gas from the fuel gas system.

Periodically, the boiler system would be blown down for cleaning. This water would be sent to the water recycle plant for treatment. The water would be segregated from contaminated water sent to the wastewater treatment plant.

Plant 41 — Boilers

There are package steam boilers capable of providing steam for plant start up. During operation the boilers will continue to provide steam to supplement steam provided by recovery of waste heat, such as the Hydrogen Plant waste heat recovery.

Plant 42 — Plant Air

Plant air is required for utility usage throughout the plant for pneumatic tools and other maintenance activities.

Plant 43 — Instrument Air System

Compressed air would be required for various operations at the refinery. Consequently, the refinery would produce the instrument and utility air required for its operations. Two instrument air compressors would discharge air to two moisture separators, a prefilter, an air dryer and an air receiver. From the air receiver, air would be distributed to units throughout the refinery.

Plant 44 — Nitrogen System

Nitrogen would be purchased and delivered to the refinery by truck. The nitrogen would be offloaded into liquid nitrogen storage tanks. From the tanks, a nitrogen header would distribute the nitrogen throughout the refinery.

Plant 45 — Emergency Power (UPS)

In case of a loss of electrical power to the refinery, the uninterrupted power supply will supply critical power from a battery source.

Plant 46 — Fire Water System

A fire water system would be constructed, operated, and maintained as part of the refinery. This system would be capable of delivering 1,100 gallons of water per minute in an emergency (2 pumps, each moving 550 gpm). Two vertical pumps in the fire water pump house would provide fire water through a fire water header to hydrants and fixed fire water systems located at strategic locations throughout the refinery. Water would be supplied to the pump house from two dedicated fire water reservoirs. The reservoirs would hold 600,000 cubic feet (4.5 million gallons) of uncontaminated water. The fire water pump house would be located adjacent to the fire water reservoirs and would pump water directly from the reservoirs. Assuming 75 percent availability and both pumps running, the system could deliver 1,100 gpm of fire water to a fire continuously for 50 hours.

The fire water reservoirs would be constructed and filled before the refinery is mechanically completed. The fire water reservoirs would be constructed early so uncontaminated stormwater runoff could be used to initially fill them. Well water may be used as an additional water source; in the event uncontaminated stormwater runoff does not fill the fire water reservoirs. During operation, the reservoirs would be maintained at capacity by pumping water from the evaporation pond. If needed during an emergency, water in the evaporation pond or from the water supply wells could be pumped to the fire water reservoirs to supplement the standing supply.

Plant 47 — Power Supply

The power supply is designed to provide two independent sources of power from the utility supplier in the area, Verendrye Electric. The power will be reduced to the plant voltages from the line supply voltage. The lower voltage power will be directed to substations in the refinery through switchgear and MCC's to the individual process units. In addition, there will be an emergency generator (diesel driven) capable of providing power for critical services (such as reflux pumps etc.) in the event of a power failure.

Plant 48 — Control Room/Lab

The control room is the central control system for the refinery and houses the Distributed Control System (DCS) for board mounted control throughout the units. The laboratory is adjacent and contains all the testing apparatus for quality control of all the process streams in the refinery.

Plant 49 — Fuel Gas System

Fuel gas refers to any gas generated within the refinery that is combusted. The main source of fuel gas for use in the refinery would be the amine unit. Here, treated (sweetened) fuel gas would be produced during the treatment of sour gas streams sent to the amine unit from various refinery operations. The treated fuel gas would be sent to a main fuel gas separator, where it would be metered and distributed to the various refinery operations.

Plant 50 — Flare System

The flare system has two main components: the flare knockout drum and the 180-foot tall flare stack. Waste gas streams from several units would be diverted to the flare knockout drum. Liquids that accumulate in the drum would be pumped to the waste water treatment system for treatment. The gases would be sent directly to the flare, which would operate at 165°F.

The flare would have sufficient controls and a flare detection system to ensure that it is working and that it is working efficiently. The flare would have three pilots, each with an igniter, flame sensor, and a fire eye. Each of the three fire eyes would be connected to an alarm, which would go off if no flame is detected. The image from a camera that would be focused on the flare and the three pilots would be shown continuously on a screen in the main control room. Finally, an infrared sensor would monitor the flare for surges of hydrocarbons. If such a surge is detected, the sensor would increase the production of steam from the steam injection ring to minimize the formation of soot and smoke. The response of the infrared sensor is substantially quicker than that of a human controller.

Unit T — Water Treatment

The water treatment unit would handle all water, except the fire water. This includes raw water, treated water, and waste water.

The source of water for the refinery would be four water wells. Water would be pumped from the wells to a 5,000-bbl raw water holding tank. As it is needed, water would be withdrawn from the holding tank to a raw water sump by means of raw water sump pumps. The water would then be pumped to two treatment buildings that would provide primary and secondary softening. From the softening treatment, the water would be pumped to the treated water storage tank that feeds the boiler feedwater system.

The four water wells also would provide potable water for uses in offices and buildings. The water treatment facility would treat the water for sanitary uses. The delivery system for sanitary water would be separate from all other water delivery systems.

Figure 2-3 and Figure 2-4 show a well water supply of 40 gpm plus surface precipitation and a net effluent of 53.9 gpm [e.g. 50.4 gpm surface water discharge and 3.5 gpm septic system (sanitary) discharge]. Once the inventory of plant water has been established, the facility will be self sufficient for water without drawing upon well water supply during periods of normal precipitation. Thus, Figure 2-4 shows operations with no recycling of water and Figure 2-3 shows operations with full recycling of water.

Plant 55 — Waste Water

The refinery would generate three types of waste water: sanitary waste water, uncontaminated (non-oily) water, and contaminated or potentially contaminated (oily) water. Each of these streams of waste water would be handled separately. They also would receive different levels of treatment.

Sanitary waste water from the offices and other buildings would be collected and disposed of via a sanitary sewer system. All water collected by this system would be discharged via a septic system and leach field. Figure 2-3 and Figure 2-4 show the 3.5 gpm of fresh water that would be used for sanitary purposes and discharged via the septic system and leach field.

The second type of waste water is uncontaminated (non-oily) waste water which originates from two sources, the boiler system and stormwater. Waste water from the boiler system (boiler blowdown) will be routed to the Water Recycle Plant (WRP) for treatment and recycling back to refinery processes (Figure 2-3 and Figure 2-4). This waste water will be segregated from the contaminated (oily) waste water to minimize production of hazardous sludge. Uncontaminated (non-oily) stormwater will be collected from non-process areas of the refinery and routed to a 7.48 million gallon evaporation pond. Waste water from the evaporation pond would be used as makeup water for the fire water system (two reservoirs of 2.25 million gallons each) as needed, recycled back to the refinery processes or when necessary discharged through a NPDES permitted outfall.

The third type of waste water would consist of contaminated (oily) waste water. Wastewater collected from process operations (primarily the Sour Water Stripper) would be routed directly to the WWTU for treatment and then directed to two effluent holding ponds (700,000 gallons each/1.4 million gallons total). Potentially contaminated (oily) stormwater will be collected from process areas (i.e. loading area, tank farm (Figure 2-5) and routed directly to a 1.4 million gallon holding pond. Depending on quality, the waste water from the holding pond would be directed to the two effluent holding ponds described above or sent to the WWTU for treatment and then into the effluent holding ponds. The effluent from the holding ponds would be recycled back to refinery processes as needed, or discharged through a permitted NPDES outfall in this alternative. It may be used for irrigation or disposed of in an injection well as discussed in the effluent alternatives section. All waste water treatment processes would be proven technology and would be designed to meet quality requirements for recycling back to refinery processes, NPDES discharge permit requirements, irrigation/land application requirements, or UIC requirements.

Water directed to the WWTU would first pass through an American Petroleum Institute (API) separator. The separator would remove non-emulsified oil and oil-bearing sludge from the water by allowing it to float to the surface of the water where it would be skimmed off. The oil skimmed off the water would be recycled to the crude unit (Figure 2-6). From the API separator, the water would be discharged to a dissolved air flotation (DAF) system.

The DAF system would use air to remove oils, greases, and suspended solids from the stream of waste water. In the DAF system, a portion of the clean effluent is removed, super saturated with air, and mixed with the waste-water influent before being injected into the DAF separation chamber. Inside the separation chamber, the dissolved air comes out of solution producing millions of microscopic bubbles. These bubbles attach to solids and oils and float them to the surface where they would be skimmed and removed from the tank. Sludge and solids from the DAF would be sent to the sludge thickener, centrifuge or plate press, before being transported offsite (Figure 2-6).

Waste water effluent from the DAF system would then be directed to the bio-treatment plant. In this plant, organic chemicals in the waste water would be biodegraded using bacteria. The bacteria would continuously metabolize the organics in the water, which converts them to CO_2 and water. Using blowers and a high-efficiency diffuser manifold system, oxygen would be supplied to the microbial layer to provide proper conditions for microbial growth.

Waste water effluent from the bio-treatment plant would be held in the two holding ponds (700,000 gal each) and tested. If testing suggests additional treatment is needed, the water would be recycled through the WWTU. If the water meets the refinery's criteria for discharge, it would be released to discharge Outfall 002.

Unit W — Storage, Blending, and Shipping

The refinery would maintain storage tanks and support facilities of sufficient size and capability to handle the production, handling, blending, and distribution of the products produced by the refinery. The primary components of this unit include storage tanks and vessels, rail and truck loadout facilities, and a vapor recovery system. The storage tanks would be in the tank farm and the rail and truck loadout facilities would be in the product loading area on the north side of the refinery site (Figure 2-7). The following sections describe each component.

Figure 2-3 Wastewater Treatment System with Full Recycling

Insert here

back Figure 2-3

Figure 2-4 Wastewater Treatment System with No Recycling

insert here

back Figure 2-4

Table 2-2 Summary of Tanks to be Constructed on the Refinery Site

Content of Tank	Volume (bbls)	Size of Tank Diameter (feet)	Size of Tank Height (feet)	Type of Tank
Crude Oil	40,000	85	48	Floating roof
Crude Oil	40,000	85	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Raw Light HC	5,000	30	40	Floating roof
Light Slop HC	5,000	30	40	Floating roof
Hydrocrackate	5,000	30	40	Floating roof
Naphtha	5,000	30	40	Floating roof
Ethanol	5,000	30	40	Floating roof
Alkylate	10,000	45	40	Floating roof
Reformate	10,000	45	40	Floating roof
Bio-diesel	10,000	45	40	Floating roof
Atm Red Crude	8,000	42	40	Fixed Roof
Raw Heavy HC	5,000	30	40	Fixed Roof
Raw Heavy Diesel	8,000	42	40	Fixed Roof
Raw Light Diesel	8,000	42	40	Fixed Roof
Heavy Slop HC	5,000	30	40	Fixed Roof
Regular Gasoline	25,000	67	40	Floating roof
Regular Gasoline	25,000	67	40	Floating roof
Premium Gasoline	25,000	67	40	Floating roof
Off Road Gasoline	3,000	30	32	Floating roof
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
n Butane	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Total	461,000			

Source: Woolley 2003, Woolley 2006

Plant 60 — Storage Tanks and Storage Vessels

The eastern half of the refinery site would be occupied by the tank farm (Figure 2-7). The farm would include tanks for feedstock (n=2), intermediate products (n=16), and final products (n=5). Table 2-2 shows the projected inventory of storage tanks. Storage tanks would include both floating roof and fixed roof tanks. Storage tanks with floating roofs are used for storing volatile petroleum products with higher flash points to minimize va por loss. The roof rests on the liquid, which greatly reduces the vapor space between the top of the tank and the top of the liquid. Minimizing the vapor space also reduces the potential for fires. Fixed roof tanks are used for storing less volatile products because they tend to have higher vapor loss.

The tanks and tank farm would be constructed to minimize the potential for accidental releases of the products stored in the tanks. The lower third of each tank would be double-walled. Additionally, each tank would be diked and the space inside the dike would be lined with a geotextile liner. Each dike would be sized to hold the entire contents of the tank plus stormwater from a 100-year, 24-hour storm event. The 100-year, 24-hour storm event for the portion of North Dakota that encompasses the project site is about 5 inches (Hershfield 1961).

Six vessels would be constructed to store butane and propane (Table 2-2). Storage vessels are pressure vessels or tanks that are generally used for storing organic liquids and gases with high vapor pressures (in contrast to floating and fixed roof tanks that store products at atmospheric pressure). Propane delivered from the merox plant would be stored until sent to the loading facilities for distribution. Field butanes would be delivered to the butane storage tanks via transport trucks. These field butanes would then be pumped to the iso-octane unit as an addition to the feedstock. Butane generated in the iso-octane unit would be pumped to a butane storage tank and then to the butane blending pump for blending with gasoline.

Plant 61 — Blending

The preparation of finished products involves a blended recipe of various components to produce the final specification product. These requirements change seasonally so tankage must be designated as component tankage, blending tankage and finally sales tankage. The blend tank is filled with various components and is blended with tank mixers or circulating pumps. Laboratory testing is conducted to ensure product quality and then the blend tank is released to sales. All deliveries are obtained from approved sales tankage only.

Plant 62 — Shipping and Receiving

Product delivery would be provided by railroad and truck delivery.

Rail Loading

Rail loading would be provided for light diesel, heavy diesel, regular gasoline, and premium gasoline. These loading facilities would use the vapor recovery system to control emissions during loading. The loading area also would be paved with concrete surrounded by curbs. All process drains would be sealed and elevated above grade. Hydrocarbons collected in these drains would be returned for reprocessing. Stormwater drains would be mounted in the concrete flush with grade. Water collected in these drains would be delivered to the WWTU for treatment.

Figure 2-5 Stormwater Collection Areas

Insert here

back Figure 2-5

Figure 2-6 Hazardous Waste Generation, Refinery Wastewater Treatment Plant

Insert here Figure 2-6

back Figure 2-6

Figure 2-7 Site Layout

Insert here Figure 2-7

back Figure 2-7

Truck Loading

Truck loading facilities, with vapor recovery systems, would be available for loading and shipment of light diesel, heavy diesel, regular gasoline, premium gasoline, and propane. Field butanes would be delivered to the butane storage vessels via transport trucks unloaded at the truck loading facility.

As with the rail loading facilities, the truck loading area would be paved with concrete surrounded by curbs and dual drain systems installed. All process drains would be sealed and elevated above grade. Hydrocarbons collected in these drains would be returned for reprocessing. Stormwater drains would be mounted in the concrete flush with grade. Potentially contaminated (oily) stormwater will first be sent to a holding pond and could be routed to the WWTU effluent holding ponds or to the WWTU (API Separator).

Vapor Recovery System

The refinery would incorporate a vapor recovery system to minimize the loss of volatile organic compounds (VOCs) from the tank farm, rail and truck loading docks, and the WWTU. This system would consist of floating roof, spherical, and bullet storage tanks in the tank farm and a separate pipe loop that would collect vapors at each tank, loading spot, and the WWTU. Vapors captured by the system would be compressed, air cooled, and returned to the process for recovery. This vapor recovery system would minimize fugitive emissions of VOCs from the refinery.

Unit X — Bio-diesel

Initially, the MHA Nation would purchase bio-diesel for blending at the refinery. Bio-diesel is readily available at favorable economics. Consequently, MHA Nation proposes to open the refinery with only a bio-diesel blending plant.

Plant 66 — Bio-diesel

The economic situation favoring buying bio-diesel over producing the bio-diesel is unlikely to last. Consequently, the MHA Nation expects the need to produce bio-diesel at the refinery in the future. As a result, the MHA Nation has included this unit in the proposed project action because it ultimately would be constructed even though it may not be built initially.

The bio-diesel plant would convert oil from soybeans into a mono alkyl ester of long chain fatty acids or bio-diesel. Although this bio-diesel would have an excellent cetane index and no sulfur content, the pour point would be relatively high for cold weather use. Consequently, the output of this plant would be blended with the refinery diesel pool to produce a useable bio-diesel product. The bio-diesel plant would be sized to produce up to 300 BPSD of bio-diesel from 8,500 bushels per day of locally grown soybeans, canola, or camelina.

In the plant, bio-diesel would be produced using the base catalyzed transesterification process. In this process, the soybeans would be crushed mechanically to release their oil. This oil would then be reacted with a short-chain alcohol, such as methanol, in the presence of a catalyst. The catalyst would be sodium or potassium hydroxide, which would be premixed with the methanol. The reaction would produce bio-diesel and glycerin. Generally, 100 pounds of oil reacted with 10 pounds of methanol and 1 pound of catalyst would produce 100 pounds of bio-diesel and 10 pounds of glycerin. The residual solids would have market value as animal feed. Both the soybeans and mash would be contained in covered storage units.

Unit Z — General Refinery

Plant 80 — Off-Sites

Each of the process units is defined by a battery limit boundary within which all the related equipment is contained. These facilities are considered to be Inside Battery Limits (ISBL). Everything else in the refinery is considered to be Outside Battery Limits (OSBL). These are referred to as Off Sites, and include such things as interconnecting pipe racks, roads, connections to infrastructure coming to the refinery (power, crude oil pipelines, natural gas pipeline, and water supply.

Plant 81 — Office/Warehouse

The office and warehouse are connected together to provide a central location for administrative staff at the refinery. The warehouse will contain very valuable spare parts critical to the operation. The warehouse will also have a machine shop with tools to provide maintenance spare parts right on site. The medical facility will also be attached to the Warehouse including a garage for the Fire Truck, ambulance and foam wagon. The central location leads to better supervision of these critical services.

Plant 82 — General Unit

The general area is designated to assign control over office equipment, mobile equipment, safety equipment, and other equipment used refinery wide, but not assigned to a specific unit.

Pollution Prevention Measures

The MHA Nation Refinery's design incorporates many measures to minimize pollution. Many of these design elements, such as the use of synthetic oil, air instead of water for cooling, double-walled tanks, and a vapor recovery system, are identified in previous sections. Wastewater pollution prevention measures include segregating potentially contaminated (oily) and uncontaminated (non-oily) stormwater, reuse of treated wastewater in refinery processes and reuse of uncontaminated (non-oily) wastewater in fire water system. Additional pollution prevention measures include monitoring plans, spill contingency plans, designating a waste minimization and pollution prevention coordinator, regularly assessing hydrocarbon losses, segregating oily from non-oily wastes, minimizing the use of drums for chemical additives, conducting regular and pertinent personnel training, and using centralized computerized monitoring systems.

Construction Phase

The description of the construction phase for the refinery has been divided into several elements. They are the refinery itself, the pipeline that would connect the refinery to Enbridge's oil pipeline, connections to utilities (natural gas and electricity), the railroad spur, and workforce requirements. Details of these elements are presented in the following sections.

Refinery

The MHA Nation expects to begin constructing the MHA Nation Refinery during 2007 after it has acquired the appropriate permits. Construction would take 18 to 24 months. Consequently, the refinery would begin producing gasoline, diesel, and propane in 2009.

Construction would begin with the stripping of topsoil, grading of the refinery site, and excavating foundations and spaces for underground works (Figure 2-8). The topsoil would be stockpiled in a berm along the northern boundary of the refinery site. This berm would provide some screening of the refinery from Highway 23. The topsoil would be used during reclamation of the site after the refinery is decommissioned and removed.

As excavations for foundations and spaces for underground works are completed, construction of these facilities would begin. Pipe racks and piping that would connect the various modules would then be constructed (Figure 2-9). As the piping for connecting the various processes, including the storage tanks, process units, and loading units, is completed, the units would be constructed (Figure 2-10).

The process units would be modular in nature and shipped to the refinery site via truck or rail when ready (Figure 2-11). These modules would then be dropped into place using cranes and plumbed into the existing pipeline connections. The MHA Nation expects most of the modules would be fabricated at shops in North Dakota.

Figure 2-8 Example of Initial Excavation of a Refinery

Figure 2-9 Aerial View of Typical Foundation and Underground Structure Construction

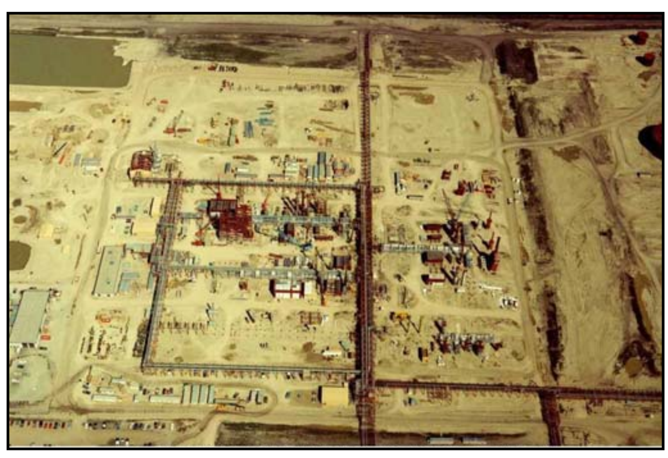

Figure 2-10 Typical Construction of above-ground structures

Figure 2-11 Example of a Modular Unit Arriving at a Refinery Ready for Installation

Oil Pipeline

Enbridge Pipelines of North Dakota (Enbridge) would supply the synthetic crude oil feedstock to the refinery. Enbridge would tie into a synthetic crude oil pipeline in Outlook, Montana and pump the oil through its existing system to its Wabek/Plaza field pipeline, which terminates about 4 miles north of the refinery (Figure 2-1). Enbridge would construct a new pipeline to connect the terminus of its Wabek/Plaza field pipeline to the crude oil storage tanks in the refinery's tank farm (Figure 2-12). Additionally, Enbridge would have to construct four new 30,000-bbl storage tanks between Outlook, Montana and the refinery (Figure 2-1). Thus, Enbridge would provide the synthetic crude oil to the refinery using the combination of existing pipelines and storage tanks, new pipeline, new storage tanks at existing stations, and new pumping facilities.

Along its existing pipeline, Enbridge would construct four new 30,000-bbl tanks to store the synthetic crude. Enbridge would need these tanks to facilitate its operations and ability to keep oil flowing to the refinery. Two of the tanks would be constructed in Montana and two would be constructed in North Dakota. Enbridge would construct all four tanks on properties where it already has pumping stations, storage tanks, and other facilities (Table 2-3). The tanks would be constructed on portions of the properties that were cleared of vegetation, graded, graveled, and fenced during development of the original facilities in anticipation of future expansion. Thus, no expansion of these stations or construction on undisturbed ground would be needed to accommodate the new storage tanks. The four tanks would be constructed similarly to those at the refinery (floating roof, double walled at bottom, and diked).

Table 2-3 Locations of Proposed 30,000-bbl Storage Tanks along Enbridge's Pipeline

Station Name	County	Legal Description
Montana		
Outlook	Sheridan	Township 36 North, Range 53 East, Section 21, SW¼
Reserve	Sheridan	Township 33 North, Range 56 East, Section 30, NW¼ of NW¼
North Dakota		
Grenora	Williams	Township 159 North, Range 103 West, Section 14, NE¼ of NE¼
Beaver Lodge	Williams	Township 156 North, Range 95 West, Section 32, SE¼ of SW¼

Enbridge would construct a new pipeline to connect the refinery to its Wabek/Plaza field pipeline (Figure 2-12). This pipeline would extend 4 miles to the terminus of the Wabek/Plaza field pipeline in the SW¼ of Section 2, Township 152 North, Range 88 West to the refinery. About one mile of the pipeline would be constructed along a local road and three miles would be constructed along a railroad belonging to the Canadian Pacific Railway.

The pipeline would be a standard type of pipeline for crude oil. Enbridge would construct the pipeline of steel pipe. It would have an outside diameter of 6⅝ inches. The pipeline would be buried with a minimum cover of 36 inches.

Construction of the pipeline would follow standard methods. The pipeline would be constructed in a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take three to four weeks. The construction spread would involve 10 to 12 workers. Enbridge would stage the construction from the terminus of its Wabek/Plaza field pipeline, which would involve only property it already leases. Construction practices would follow the stormwater pollution prevention plan according to the stormwater construction permit.

Before construction begins, the centerline and the exterior boundaries of the ROW would be staked. The pipeline would be constructed within the right-of-way of the road and Canadian Pacific Railway's rail line. The permanent right-of-way would be 10 feet wide, which is the maximum the Canadian Pacific Railway would allow.

Following construction, Enbridge would test the pipeline and reclaim the area disturbed during construction. The pipeline would be tested hydrostatically. After soil over the pipeline is graded to approximate original contour, it would be seeded with seed mixes approved by the landowner. Construction and reclamation conducted through wetlands would be conducted according to nationwide permits Enbridge commonly uses for constructing pipelines.

Natural Gas Pipeline

The refinery would require natural gas for operations. Natural gas would be both a source of hydrogen and fuel. The hydrogen would be used to remove sulfur from the oil. The proposed project action includes steam methane reforming as the process for generating the hydrogen needed in the process. Demand for natural gas would be 6 MMSCFD.

The MHA Nation is considering two options for providing natural gas to the refinery. First, Montana Dakota Utilities (MDU) Resources Group, Inc. would supply natural gas using a new pipeline that would connect its existing Williston Basin Interstate Pipeline to the refinery (Figure 2-12 and Figure 2-13). This pipeline would extend 29 miles from the existing pipeline in the NE¼ of Section 24, Township 155 North, Range 88 West to the refinery. As with the oil pipeline, a portion of the pipeline would be constructed along the railroad belonging to Canadian Pacific Railway. The oil and gas pipelines would be constructed on opposite sides of the railroad because of space requirements.

Under the second option, Bear Paw Natural Gas Company (Bear Paw) would supply natural gas using a new pipeline that would connect its existing Plaza pipeline to the refinery (Figure 2-12). This pipeline would extend 4 miles from the existing pipeline in the NE¼ of Section 3, Township 152 North, Range 88 West to the refinery. As with the oil pipeline, about one mile of the pipeline would be constructed along a local road and three miles would be constructed along the railroad belonging to the Canadian Pacific Railway. The oil and gas pipelines would be on opposite sides of the railroad because of space requirements.

Under either option, the pipeline would be a standard type of pipeline for natural gas. MDU Resources or Bear Paw would construct the pipeline of steel pipe. It would have an outside diameter of 8 inches. The pipeline would be buried with a minimum cover of 36 inches.

Construction of either pipeline would follow standard methods. The pipeline would be constructed in a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take three to four weeks. As with the oil pipeline, the construction spread would involve 10 to 12 workers. MDU Resources or Bear Paw would stage the construction from existing facilities near the pipeline's route. Thus, they would not need to acquire any additional property to stage construction of the pipeline. Construction practices would follow the stormwater pollution prevention plan according to the stormwater construction permit.

Before construction begins, the centerline and the exterior boundaries of the ROW would be staked. The pipeline would be constructed within the right-of-way of the road and Canadian Pacific Railway's rail line on the side opposite the oil pipeline. The permanent right-of-way would be 10 feet wide, which is the maximum the Canadian Pacific Railway would allow.

Following construction, MDU Resources or Bear Paw would test the pipeline and reclaim the area disturbed during construction. The pipeline would be tested hydrostatically. After soil over the pipeline is graded to approximate original contour, it would be seeded with seed mixes approved by the landowner. Construction and reclamation conducted through wetlands would be conducted according to nationwide permits both companies commonly use for constructing pipelines.

Figure 2-12 Proposed Pipelines, Power Lines, and Project Site

Back of figure 2-12

Figure 2-13 Location for the Montana Dakota Utilities Resources Natural Gas Pipeline

Insert Figure 2-13

back Figure 2-13

Power Lines

The refinery needs a constant supply of 6 to 7 megawatts (MW) of electricity. Blackouts can cause substantial problems. Consequently, electricity would be supplied to the refinery from two separate circuits.

Verendrye Electric would provide electricity to the refinery by constructing new power lines from two separate locations and 41.6 kV circuits (Figure 2-12). The first connection would occur in the southeast corner of Section 15, Township 152 North, Range 86 West. Verendrye's main north-south loop line crosses Highway 23 at this location. From here, Verendrye would construct a new power line along the edge of the Highway 23 right-of-way to the northeast corner of Section 19 at the Project Site. The line would then proceed south along the edge of the gravel road right-of-way to the southeastern corner of the north ½ of Section 19. At this corner, Verendrye would construct the primary substation for the refinery (Figure 2-7). The total length of the power line would be almost 9.5 miles and the substation would occupy 0.4 acres of the project site.

The second connection would be in the southeast corner of Section 30, Township 152 North, Range 87 West. Verendrye's main east-west loop line runs along the southern edge of Section 30. The new power line would follow the gravel road right-of-way 1½ miles north from this connection to the location of the new substation in the southeastern corner of the north ½ of Section 19. From the substation, a single power line would be constructed into the refinery (Figure 2-7).

Construction of the power lines would follow standard methods for constructing power lines. The structures would be the same as currently exist for both loop lines (Figure 2-14). Consequently, the power lines would be constructed to prevent the electrocution of raptors. Verendrye would construct the power lines by drilling holes for the poles, installing the poles, and hanging the conductors from each road's right-of-way. Thus, Verendrye would require only a minimal easement along each road.

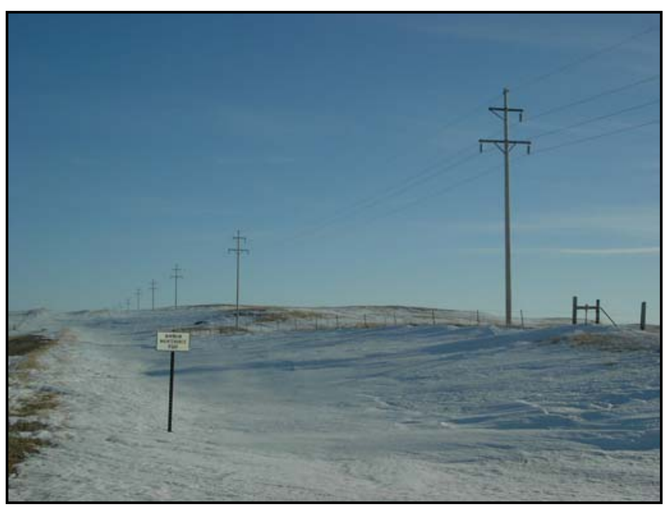

Figure 2-14 Existing Verendrye Power Line at Highway 23 Crossing

The power lines would be constructed using a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take 5 weeks. The construction spread would involve 8 workers.

Water Wells

As noted earlier, water for the refinery would be provided by four wells drilled from the refinery site. These wells would probably be completed into the Fox Hills-Hell Creek bedrock aquifers. Depths of the wells could range from 150 to 1,000 feet.

Railroad Spur

A railroad spur would be constructed into the refinery from the existing railroad that crosses the project site (Figure 2-5). The Canadian Pacific Railway, which owns the railroad, would construct a spur into the refinery's loading area (Figure 2-7). This spur would facilitate the delivery of feedstock and shipment of product via rail.

Construction of the railroad spur would follow standard methods. Existing vegetation would be cleared from the new rail bed. Ground that would be under the rail bed would be grubbed and the topsoil would be removed and stockpiled for reclamation after the spur is decommissioned. Gravel and other materials required for the rail bed would be acquired from local sources. After the subgrade is prepared, sub-ballast material would be placed and compacted to a depth of 6 to 12 inches. Ties and rail would be laid on the subgrade and welded in place. Ballast would then be brought in, dumped on the subgrade and around the ties, and compacted into place to a minimum depth of 8 to 12 inches below the tie. Areas adjacent to the rail bed and outside the product loading area that were disturbed during construction would be regraded, covered with topsoil, and seeded and mulched.

The portion of rail spur in the product loading area would not be regraded and covered with topsoil. Instead, this area would be covered with concrete. This concrete would contain any leaks that occur during loading or unloading of rail cars at the refinery.

Workforce Requirements

A substantial number of workers would be required to construct the refinery. A peak of 800 to 1,000 labors and skilled workers are expected to be employed in the refinery's construction during 18- to 24-month long construction period.

A substantial portion of the construction workers are expected to be members of the MHA Nation. (Fort Berthold Community College currently conducts training courses for Indians that are interested in working at the refinery.) Consequently, many of the workers would live on the Fort Berthold Reservation and would commute to the refinery site daily to work. The rest of the workforce is expected to live in or around Minot. Consequently, they would commute to the refinery site from Minot daily.

Operation and Maintenance Phase

This section describes the operations of the various facilities and notable maintenance procedures.

Refinery

Products

During the operation and maintenance phase, the refinery would operate for 347 stream days annually. During the other 18 days, production at the refinery would be shut down for maintenance. With 347 days of production annually, the refinery would produce almost 2.0 million bbl of diesel fuel, 2.3 million bbl of gasoline, and 0.1 million bbl of propane on average every year. These products would be shipped from the refinery via truck and rail car as discussed in the section on traffic below.

Water Demand and Treatment

As noted earlier, water for the refinery's processes and daily use would come from four wells drilled on site. The refinery's overall operational demand for water would be 40 gallons per minute (gpm). Because the refinery would be operating with air cooling equipment instead of water cooling equipment, the demand for water would be far less than occurs at other refineries in operation in the U.S. and North America. The closest refinery (in size and type) is the Turbo Refinery in Canada, which also uses air cooling. This refinery, which has a desalter, uses up to 250 gpm of water. No desalter is needed for the MHA Nation's refinery because the crude is already treated at the source in Canada.

The refinery's water treatment facilities would handle water used in the various processes and stormwater that falls within the loading area, tank farm, and process area. Handling and treatment of the waste water would depend on the source of the waste water (Figure 2-3 and Figure 2-4). Contaminated water from processes would be routed to the WWTU for treatment before being released to holding ponds and discharged through Outfall 002.

At least 10 of the 40 gpm demand would be recycled through the WRP. However, half or more of the 40 gpm could be recycled, depending on the amount of actual contamination that occurs (Figure 2-4). The portion of the waste water too contaminated for recycling would be routed to the WWTU for treatment. Contaminated water could be held in the three holding ponds, before treatment (1 holding pond) and after treatment (2 holding ponds). The wastewater will be tested prior to release to NPDES permitted Outfall 002.

Solid and Hazardous Waste and Solid Byproduct Production

The refinery would produce solid waste and would be classified as a generator of hazardous waste under 40 CFR 262 and would be a Treatment, Storage and Disposal (TSD) Facility under 40 CFR 264. Projections suggest the refinery would produce about 660 pounds of solid waste per day. The solid waste streams generated by the WWTU and WRP would be segregated to minimize the amount of hazardous waste requiring disposal. By segregating the streams, about 600 of the 660 pounds of solid waste produced daily would be non-hazardous. Consequently, the refinery would produce about 60 pounds of hazardous waste daily.

Wastes designated as "hazardous" would be temporarily stored on site prior to handling and shipment offsite to permitted commercial facilities for treatment, disposal, or both. Any waste generated in the units would be contained and controlled before placement in storage/shipment containers. No hazardous wastes would be stored for more than 90 days from the time of generation, unless an extension is requested by the refinery and granted by the EPA, as allowed for in 40 CFR 262.34 (b). Reasons for such an extension would be unforeseen, temporary, and uncontrollable circumstances. The temporary storage of hazardous wastes would take place in full compliance for management of tanks, containers, drip pads, or containment buildings (40 CFR 262.34 (a)).

The MHA Nation's refinery would generate solid wastes at a much lower level than the average existing refinery. The American Petroleum Institute surveyed 117 refineries and concluded solid wastes, on average, represent about 0.08 percent by weight of the crude oil feed. For the MHA Nation's refinery, this amount would be 2,100 pounds per day. However, the amount of wastes that would actually be produced (660 pounds per day) would be substantially lower than results of the survey suggest because the feedstock would be cleaner and the refineries involved in the survey have processes that would not be constructed at the MHA Nation's refinery (vacuum units, water cooling towers, desalters, and cokers) that produce substantial amounts of wastes.

The refinery's configuration also includes a bio-diesel process unit to convert locally grown soybeans to bio-diesel. The plant has been designed to produce about 300 BPSD of bio-diesel from 8,500 bushels per day of locally grown soybeans. The residual solids from the bio-diesel process (byproduct) have market value as animal feed. The soybean feed would be transported into the refinery and the solid residue exported by truck and rail. On-site storage for soybeans and soybean mash would consist of two concrete silos, one for the soybeans and one for the mash. Each silo would be 20 feet in diameter and 100 feet tall.

Traffic

The refinery would generate new traffic to and from the project site. This traffic would consist of cars, trucks, and rail cars. Most of the trucks would be semi-tractor trailer types and the rail cars would be tank cars. About 70 employees would be commuting to and from work daily. However, these employees would not be arriving and departing simultaneously because they would be distributed across three shifts. Most of the feedstock and shipments that are not transported via pipeline would arrive or depart the refinery via truck (Table 2-4). Only butane would arrive via rail tank car. Once the biodiesel plant is constructed and functioning, soybeans and soybean mash will also be delivered by railcar.

Maintenance

The refinery would have a specific and detailed maintenance plan in place when it begins operations. This plan would define the various duties (for example, inspections, periodic work, and shutdowns), schedules (daily, weekly, monthly, annually, and periodically), and responsibilities for all processes and facilities at the refinery.

Table 2-4 Summary of Weekly Truck and Rail Traffic at the Refinery

	Number of Vehicles by Type	
Traffic	Semi-truck	Rail Car[1]
Incoming		
Butane	22	20 movement in
Ethanol	14	
Bio-diesel[2]	8	
Soybeans[3]	15	14
Outgoing		
Gasoline	161	
Diesel	154	
Propane	6	
Sulfur	1	

Soybean mash[3]		14
Non-hazardous sludge	1	
Hazardous sludge	<1 [4]	
Total (without full bio-diesel unit)	367	20
Total (with full bio-diesel unit)	374	48

Notes:
1. All rail cars would be included in a single outbound train and a single inbound train each week.
2. Bio-diesel would be purchased and used for blending when the refinery opens. Purchasing of bio-diesel would continue as long as it is economically favorable to do so.
3. Soybeans and soybean mash would be supplied to and from the refinery only after buying bio-diesel directly becomes economically unfavorable and the bio-diesel unit has been constructed.
4. One truck per month.

Oil Pipeline

During operation of the refinery, Enbridge's oil pipeline would supply 10,000 BPSD. Assuming the refinery operates for 347 stream days per year, Enbridge would supply 3.47 million barrels of oil to the refinery annually.

Once the pipeline is on line, it would become part of Enbridge's overall system of pipelines. Consequently, it would fall under Enbridge's program of routine inspections and maintenance. Enbridge's maintenance program follows all U.S. Department of Transportation regulations for pipelines.

The pipeline would be monitored 24 hours per day. Pressure within the pipeline and readings from meters would be monitored electronically. The pressure and readings from meters would be transmitted to Enbridge's 24-hour control center. Changes in pressure or inconsistent readings from the meters would indicate if a leak has developed.

Utilities

During operation of the refinery, the natural gas pipeline would supply 6 MMSCFD. Assuming the refinery operates for 347 stream days per year, MDU Resources or Bear Paw would supply 2,000 MMSCFD of natural gas to the refinery annually.

Once the pipeline is on line, it would become part of MDU Resources' or Bear Paw's overall system of pipelines. Consequently, it would fall under the appropriate company's program of routine inspections (monitoring) and maintenance. MDU Resources' and Bear Paw's maintenance programs follow all regulations for natural gas pipelines.

The two power lines and substation would become part of Verendrye's overall system of power lines. Consequently, the lines and substation would fall under Verendrye's program of routine inspections (monitoring) and maintenance. Verendrye's maintenance program follows all regulations for electrical distribution lines.

Workforce Requirements

The refinery would require new workers during the operation and maintenance phase of the project. There would not be any anticipated new employees for the pipelines, other utilities, or railroad. The refinery is expected to employ about 86 workers directly. The types of positions that would comprise these jobs are summarized on Table 2-5. Most of these positions would require some level of technical education, such as is currently being offered at the Fort Berthold Community College. Consequently, most of the positions are expected to be filled by the local community, which also would not increase the demand for housing. In addition, the refinery would regularly use the services of a variety of contractors throughout the year (Table 2-5).

Decommissioning and Reclamation Phase

This section describes the final phase of the project where the refinery and associated facilities would be decommissioned and removed and the project site would be returned to approximate pre-project conditions. Decommissioning consists of decontamination, dismantling, shipment and final disposition of refinery components, and site rehabilitation. Disposition of refinery plant components can take place either by re-use or depositing them into properly permitted off-site disposal sites. Decommissioning must comply with all relevant regulations, including those promulgated pursuant to RCRA.

Refinery

Upon decommissioning, all surface facilities at the refinery site would be removed. Units, equipment, and materials that could be used at other facilities would be sold and shipped to those facilities. Other units, equipment, and materials would be disassembled and sold as scrap.

After the surface facilities have been removed, the site would be sampled for contamination and remediated as necessary. Appropriate sampling and laboratory testing would be used to determine if any contamination exists and if so, to determine the areal extent of that contamination. Any contaminated areas would be remediated using methods appropriate to the materials of concern identified by the sampling and testing.

If no contamination is identified or after any contamination is remediated, the refinery site would be reclaimed. Reclamation would consist of ripping the soils, recontouring the site to approximate original contours, redistributing the topsoil that was stockpiled in the berm, and seeding. The seed mixture or mixtures used in reseeding would be determined by the MHA Nation based on post-reclamation land uses proposed for the site at the time of reclamation. The wetland will be recreated as part of recontouring and revegetation.

Utilities

All utilities would be decommissioned and reclaimed, unless the MHA Nation identifies a need for a particular utility at the time of reclamation. Assuming no post-reclamation need for the utilities is identified, reclamation would proceed as described.

The procedures for decommissioning and reclaiming the pipelines are straightforward. The underground pipelines would be purged, cleaned, disconnected, capped, and abandoned in place to avoid any unnecessary surface disturbance. The oil pipeline would be purged with nitrogen. Aboveground facilities associated with the pipelines would be removed and the surface disturbances associated with those facilities would be ripped, recontoured, and seeded with a seed mixture approved by the landowner.

Table 2-5 Summary of Workforce for the MHA Nations' Proposed Clean Fuels Refinery

Position	Shift	No. of Crews	No. of Employees/Crew	Total No. of Employees
Permanent Personnel				
Refinery Manager	Days	1	1	1
Operations Manager	Days	1	1	1
Engineering[1]	Days	1	5	5
Accounting Manager	Days	1	1	1
Accounting Staff	Days	1	3	3
Clerical	Days	1	6	6
Maintenance Planners	Days	1	4	4
Nurse	Shift	4	1	4
Dayshift Supervisor	Days	1	1	1
Shift Supervisor	Shift	4	1	4
Lead Operator	Shift	4	2	8
Plant Operators	Shift	4	10	40
Laboratory	Days	1	3	3
Safety	Days	1	1	1
Training	Shift	4	1	4
Total				86
Contract Personnel				
Security	Shift	4	2	8
Regular Maintenance[2]	Days	1	20	20
Contractors[3]	Days	1	25	25
Turnaround Maintenance[4]	Annual	1	350	350
Total				403

Notes:
1. Includes staff engineers and one process control engineer.
2. Daily tradesmen.
3. Estimate of outside contract services.
4. Annual tradesmen working for 1 month annually.

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The aboveground electrical facilities would be disconnected and removed. The conductors and power poles would be removed from along Highway 23 and 366th Street. Also, the electrical substation along the east side of Section 19 would be removed and the site reclaimed. Reclamation would involve ripping the soil, recontouring the site to approximate original contours, redistributing the topsoil that was stockpiled during construction, and seeding with a landowner-approved seed mixture.

Safety and Emergency Response

This section outlines the methods the entities involved in the MHA Nation's proposed Clean Fuels Refinery Project would employ to ensure the safe operation of the refinery and pipelines during construction, operation, and maintenance.

Fires and Explosions

The potential for leaks or ruptures in pipelines and in units at the refinery would exist. In the case of buried pipelines, most ruptures are the result of heavy equipment that accidentally strikes the pipeline. These ruptures could result in an explosion and fire if a spark or open flame ignites the escaping gas or oil. The materials used in the pipelines would be designed and selected according to applicable standards to minimize the potential for leak or rupture. Frequent markers along the pipelines would reduce the risk of accidental ruptures from excavating equipment. Additionally, the companies would monitor flows in the pipelines by either remote sensors or daily inspections of the flow meters, which would reduce the probability of ruptures through prompt detection of leaks.

Because most processes are closed, the primary potential for fire at the refinery is from leaks or releases of liquids, gases, or vapors reaching an ignition source such as a heater. Consequently, the operation of equipment and the various processes are closely monitored and controlled. An extensive, computerized plant information network would be installed to monitor all operations and provide early warnings of any developing problems. Also, operations at the refinery would conform to regulations of the Occupational Safety and Health Administration (OSHA). OSHA regulations require safe work practices and appropriate personal protective equipment (as needed for exposures to chemicals and other hazards such as noise and heat) during tests, inspections, maintenance and turnaround activities, and when handling regenerated or spent catalyst.

Public Safety

The MHA Nation would take measures to protect the public from hazards at the refinery. The entire facility would be fenced and gated to prevent unauthorized entry. Also, warning signs would be posted around the facility. The refinery would conform to all OSHA health and safety regulations. All operations and permitted releases to surface water and air would be monitored.

Employee Safety

The MHA Nation would develop an Emergency Action Plan that would cover all potential emergencies, including fires, injuries to employees, chemical releases, and general public safety. The plan would include telephone numbers for all medical and emergency services and the contacts in event of emergencies. The plan would be posted at all offices and facilities. All employees and subcontractors would be trained on the Emergency Action Plan when they are hired and refresher courses would be conducted annually.

The refinery also would develop and maintain an emergency response team. This team and its equipment would be stationed at the refinery. The equipment would include fire engines and other fire-fighting equipment and an ambulance. The members of the team would be trained emergency response technicians.

Security

The refinery would be operated as a secure facility with restricted access. The facility (all but the office building) would be enclosed by an 8-foot high chain link fence topped with barbed wire. The main gate would be manned by security personnel 24 hours per day, 7 days per week. The east gate, which primarily would provide access during construction and access to vehicles too high to clear pipe racks, would be locked and only opened by security personnel when granting access to specific vehicles. The main gate also would be monitored by a closed-circuit television camera. Security personnel would patrol the perimeter fence.

Emergency Response Plan

A Spill Prevention, Control and Countermeasure (SPCC) Plan, Facility Specific Response Plan (FSRP), Hazardous Waste Contingency Plan (HWCP), Superfund Amendments Reauthorization Act (SARA) Emergency Plan and, as applicable, a CAA Risk Management Plan and Hazardous Materials Transportation Act (HMTA) Response Plan, would be an integral part of the refinery's Emergency Response Plan in responding to releases of oil and hazardous substances. The plan would provide for an organized response to incidents and emergencies to protect the environment, employees, and public. Emergency Response Team members, as well as other designated refinery staff members, would be properly trained in the plan requirements and spill/release response and cleanup techniques and procedures. Periodic mock spill drills would take place as part of the ongoing spill response training process.

The objectives of the emergency response plan for spills or releases would be:

- to describe the responsibilities and required actions of each individual working for the refinery in the event of an environmental incident or emergency;
- to describe actions to be taken to minimize the effects of an environmental incident or emergency on personnel, equipment and the environment; and
- to describe the internal and external communications necessary in the event of an unplanned spill or release.

On-Site Incidents

Minor spills and releases would typically be contained and managed by refinery personnel assigned to a specific work area, as long as they were not exposed to significant risks, e.g., hydraulic fluid leak from machinery. Such actions typically would not require the assistance of emergency response personnel. For major spills or releases, such as a significant release of crude oil or product material such as diesel, the refinery's Emergency Response Plan would be activated, with the Emergency Response Team responding. These team members would be trained in spill response measures. As required, the Emergency Response Team would obtain the assistance of refinery operations and maintenance staff in obtaining information on the type and quantity of spilled material, shutting down or moving equipment as needed, acquisition of equipment and supplies, and providing access to areas where entry is needed to respond to the spill or release. If an emergency release exceeded the capability of the response team, or posed as an unacceptable safety risk, assistance would be requested from professional spill response specialists and contractors and the appropriate state and/or federal environmental agencies, such as, EPA and the North Dakota Department of Health.

Off-Site Incidents

Typically all minor or major off-site spills or releases would be responded to by the local Emergency Response Teams within its geographic jurisdiction. Assistance from the Refinery Emergency Response Team may be required for providing information on the spilled material, acquisition of equipment and supplies, and assisting with containment at the source of the spill or release. Only trained personnel would be allowed to participate in any cleanup activities with the potential for exposure.

If any spill or release is significant enough that it exceeded the capability of the Emergency Response Teams to adequately respond, assistance would be requested from professional spill response specialists and contractors and the appropriate state and federal environmental agencies.

Hazardous and Non-hazardous Wastes

Non-hazardous and hazardous waste residuals would be generated from many of the refinery processes, petroleum-handling operations, as well as the waste water treatment and WRP operations. Most of the solid wastes that would be generated would be non-hazardous residuals or those excluded from regulation as a waste. Most hazardous wastes would be generated upon cleaning of the WWTU. Wastes would be recycled or regenerated within the refinery as much as practical, with the remainder recycled, reclaimed, regenerated, or disposed of offsite at approved third-party facilities. Most of the wastes that would be generated would be in the form of oily, non-oily, and biological sludges (especially from the waste water and water recycle facilities); spent process catalysts; product filter/adsorbent media; slop oil emulsions/solids; tank bottom sludge; spent liquids, such as caustic and acid solutions: and pond sediments. Table 2-6 summarizes the major types of wastes that the refinery would generate.

The volume of wastes generated would vary with activities occurring at the refinery. Two major groups of activities that would occur are normal operations and periods of major maintenance activities called turn-arounds. During normal operations, maintenance activities are limited and generation of wastes is typically limited to specific operational activities. Quantities of solid wastes can be generated in the form of sludges; spent materials such as catalysts, absorbents, and chemical solutions; and cleaning solutions.

During turn-arounds, which would occur approximately every three to five years for individual process units, the refinery is shutdown for a short time. Although individual units would require turn-arounds every three to five years, turn-arounds would occur annually because individual units or groups of interdependent units would be shut down in rotation. Thus, only a partial shutdown would occur each year, which would minimize the effect of lost production. Activities would consist of cleaning out the major processing equipment and storage tanks of undesirable residues that have accumulated over time; replacing catalysts, absorbents, and other types of process media that become depleted over time; conducting required repairs; and performing any other actions necessary for the improved operation of the units and refinery.

Table 2-6 Major Types of Waste Generation Projected for the MHA Nation's Proposed Refinery

Site Of Generation	Types Of Waste
Operations And Maintenance	➢ Wastewater ➢ Spent Catalyst ➢ Spent Caustic ➢ Spent Amine ➢ Spent Acid ➢ Spent Filter/Absorbent Media ➢ Off-Spec Product ➢ Waste Oil/Oily Sludges ➢ Wash Out Solids (Flushing Of Equipment) ➢ Process Equipment Cleanup Sludge [Other Than Heat Exchangers] ➢ Heat Exchanger Bundle Sludge [KO50] ➢ Storage Tank Sludge [Crude (K169), Product, Other] ➢ Other Oily Sludges ➢ Oil Contaminated Debris ➢ Spent/Used Cleaning Solutions ➢ Waste Gases (sent to flare)
Water Recycle Plant	➢ Water Plant Filter Cake (e.g., Treatment Of Boiler Blowdown) ➢ Wastewater ➢ Unused And Used Chemicals
Waste Water Treatment Unit Wastes	➢ API Separator Sludge [KO51] ➢ DAF Float [KO48] ➢ Slop Oil Emulsions [KO49] ➢ Primary Treatment Sludges (Other Than API Separator Or DAF) [FO37] o Sludge from Process Sewer Sumps o Sludge from Process Stormwater Sumps o Primary Holding (1) Pond Bottom Sludge o Equalization Tank Solids ➢ Secondary Treatment Sludges [FO38] o BioReactor Solids o Clarifier Solids o Secondary Holding Ponds (2) Bottom Sludge o Evaporation Pond Bottom Sludge ➢ Waste Chemicals (e.g., Flocculants) ➢ Firewater Ponds (2) Bottom Sludge ➢ Sludge from Non-Process Stormwater Sumps

Table 2-6 Major Types of Waste Generation Projected for the MHA Nation's Proposed Refinery

Miscellaneous	➢ Oily Rags/Debris ➢ Empty Containers With/Without Residual ➢ Laboratory Wastes ➢ Maintenance Oily/Non-oily Wastes ➢ Industrial Waste (Non-oily Trash) ➢ Surplus And Unused Chemicals ➢ Spent Solvents ➢ Contaminated Soils ➢ Scrap Metal/Equipment ➢ Floor Dry/Absorbent ➢ Sand Blast Grit ➢ Used Hydraulic Fluids ➢ Mercury (i.e., Instruments) ➢ Paint And Paint Wastes ➢ Spent Filter Cartridges

The quantity of waste generation can be significantly higher for a short period during turn-arounds, as compared to the same period during normal operations. The operating philosophy of the refinery would be to avoid planned total plant outages (about once every 5 years). The shutting down of individual units or groups of interdependent units in rotation as discussed above also would minimize the volume of wastes mentioned above. In addition, waste minimization would be emphasized (especially for hazardous wastes). An example of this in the WWTU would be the possible use of a centrifuge and naphtha to wash and dewater oily sludges. This could greatly reduce the amount of hazardous waste sludges generated.

Waste Inventory

Non-hazardous Waste Streams

Most of the non-hazardous waste produced at the refinery would originate from the WRP. The WRP would be used to purify and recycle water to minimize water usage, as discussed earlier and shown on Figure 2-4. These streams routed to the WRP would bypass the API separator to minimize commingling with the hazardous API separator sludges and float streams, thereby reducing the amount of hazardous waste to be managed. The WRP would produce 600 lb/day of waste cake that would be disposed of in an off-site approved non-hazardous Class 2 landfill.

Additional types of miscellaneous non-hazardous wastes may include storage tank bottoms (other than crude oil), non-contaminated empty containers, contaminated soils, scrap metal, industrial trash and debris (non-oily), various maintenance shop wastes, and spent filter/absorbent media. These types of wastes would not have levels of contamination that would result in the materials being considered hazardous under RCRA.

Hazardous Waste Streams

The major anticipated hazardous waste streams to be generated by the refinery during normal operations include:

- Waste water Treatment Sludge
- Primary Sewer Sludge
- Slop Oil Emulsion Solids
- Spent Caustic Solution

The major wastes to be generated by the refinery during major maintenance activities (i.e., turn-arounds) that may be hazardous include:

- Tank Bottom Wastes
- Process Equipment Sludge
- Spent Catalyst

Each of these groups of wastes is discussed below.

Waste Water Treatment Sludge

The primary solid wastes that would be produced by the operation of the WWTU are summarized in a separate solid and hazardous wastes management report. Sludges from the API Separator and bio-treatment clarifier would be fed to the sludge thickener and sludge dryer, resulting in an estimated 56 lb/day of hazardous dried sludge that would be disposed of in a third-party licensed off-site disposal site. Figure 2-6 shows the processes that generate waste.

Primary Sewer Sludge

The source of primary sewer sludge and oil emulsions would be the waste water collection and treatment system. Oily sludges settle out of the waste water streams in sumps within the refinery. The sludges in the sumps would be periodically cleaned out and are classified as a listed hazardous waste (F037 petroleum refinery primary oil/water/solids separation sludge). These sludges would be cleaned as necessary, but typically not more than every 3-year refinery turn-around period. The solids would be recovered and sent to a third party licensed off-site disposal site.

Slop Oil Emulsion Solids

Recovered oil would be sent to a heavy slop tank, including skim oil from the API separator, oil from oily sludge dewatering, and bottom tank draws from the raw heavy oil tank and reduced crude storage tank. The recovered oil would be recycled to the crude unit for reprocessing. Any slop oil emulsion solids that cannot be recycled would be disposed of in a third-party licensed off-site hazardous waste disposal site. The slop oil emulsion solids are classified as a listed hazardous waste – KO49. The recovered oil is excluded from RCRA regulations.

Spent Caustic Solution

Caustic would be used throughout the refinery for a number of purposes, including entrained catalyst removal, sulfur compound conversion, and low pH wastewater neutralization. Examples of process units where caustic is used include the distillation section of the crude unit and the isomerization unit. The spent caustic solutions are sent to a spent caustic neutralization tank. Once neutralized, the solution would be discharged to a third-party licensed off-site disposal site.

Tank Bottom Wastes

Tank bottom wastes that accumulate in storage tanks typically consist of solids found in the stored material (for example, crude and various intermediate process streams); rust or scale from tanks, pipes, and other equipment; and heavy hydrocarbons (California Environmental Protection Agency 2004). Periodic cleaning of the tanks would occur to remove these solids that settle in the tank over several years of operation. The purpose of the cleaning includes recovery of lost tank capacity, tank integrity inspection, change in service, and repair. The frequency of tank cleanouts would depend upon the type of material stored. The storage tanks that typically require more frequent cleanout are crude oil and heavy and middle distillates. It is currently estimated that cleaning of the tanks may be required every 6 to 9 years. However, a storage tank can be cleaned out more frequently if it needs repair or refurbishment.

The synthetic crude tank sludge is designated as a “listed” RCRA hazardous waste (K169 – crude oil storage tank sediment). Therefore, any tank bottoms removed from the synthetic crude storage tanks would be handled as a hazardous waste. The amount of tank bottoms generated is minimized by the use of pretreated synthetic crude and fixed tank mixers that help keep solids from settling.

Whether the tank bottom sludge from the remaining storage tanks is classified as a hazardous waste would be determined by RCRA characteristic testing. Typically lighter product tank bottoms (for example, gasoline) are classified as a hazardous waste due to the levels of benzene. At the refinery, light products may contain benzene levels high enough to cause the bottom sludge to be designated as a hazardous waste. However, the middle distillates may not contain benzene and specific metals at levels that would cause the bottom wastes to be considered as a hazardous waste.

Cleaning of the tanks would entail centrifuging or dewatering of the sludge to minimize the amount of solid residue. Recovered oil would be returned for processing and waste water would be sent to the oily water sewer for treatment in the WWTU. Solids would be shipped to a third-party licensed off-site disposal site.

The production of heavy oil is expected to be less than 1 percent from the hydrocracking process. The feedstock would have an end boiling point of less than 1,000ºF and the heaviest component would be fed to the hydrocracker. This small bottoms stream would be sent to a user permitted to burn or blend the material.

Process Equipment Sludge

Periodic cleanout of the residues within various pieces of process equipment is necessary to maintain the preferred processing efficiencies. Such wastes are typically generated during maintenance periods, especially during plant turn-arounds. Solid residues that are not listed hazardous waste that cannot be recycled would be tested to determine whether they are a RCRA characteristic hazardous waste.

One of the major cleanout activities associated with equipment maintenance is associated with the heat exchangers. Heat exchangers would be routinely cleaned to maintain their efficiency. Accumulated residues deposited from the process streams that are either heated or cooled would be removed. This would be accomplished with the use of hydroblasting and steam. Cleaning would occur on a concrete cleaning pad that contains a drain sump that would overflow to the oily process sewer for treatment in the WWTU. The pad would be designed to collect as much of the solid residues as possible. These residues would be placed in approved hazardous waste drums for temporary storage and eventual transport to a third-party licensed off-site hazardous waste disposal site.

The removed scale and hydrocarbon solids waste generated from this cleaning activity is classified as hazardous waste KO50 – heat exchanger bundle cleaning sludge. The cleaning of the heat exchanger is expected to occur every three years during a turn-around. However, excessive fouling, such as in the crude unit, could require more frequent cleaning for some of the heat exchangers. The refinery does have the advantage of using synthetic crude as the primary feedstock, which should reduce the amount of fouling, as compared to the refineries using typical crude as a feedstock.

Spent Catalyst

Various catalysts are used throughout the refinery process for a variety of purposes, including promotion of hydrocarbon conversion reactions (hydrocracking and isomerization), reduction of sulfur and nitrogen content of certain hydrocarbon streams (hydrotreating), conversion of sulfur, and conversion of natural gas to hydrogen for use in the hydrotreating and hydrocracking reactions. Catalysts that are used in these processes lose effectiveness over time and must be regenerated or replaced. The frequency of replacement with new or regenerated catalyst depends on the type of catalyst. Most catalysts would be replaced every 3 to 5 years. Replacement typically coincides with major maintenance periods, such as turn-arounds.

Major spent catalysts to be generated at the refinery include metal-impregnated refining catalyst generated from processes that treat, crack, and reform hydrocarbon streams. The metals within the catalyst that create the necessary reactions can result in the spent catalysts being considered hazardous. Two types of spent catalysts are "listed" hazardous waste (K171-spent hydrotreating catalyst and K172-spent hydrorefining catalyst). The rest of the catalysts are tested to determine whether they are a RCRA characteristic hazardous waste. Spent catalysts that are recycled are excluded from regulation.

RCRA - Treatment, Storage and Disposal of Hazardous Waste

Under Alternative 1, the refinery as designed would be a TSD Facility. Therefore, the refinery would need to obtain a RCRA TSD permit from EPA. A TSD permit would significantly increase the regulatory requirements for the proposed refinery project (40 CFR Part 264 including RCRA corrective action requirements). This would include applicable construction requirements (including double liners) for all hazardous waste surface impoundments (40 CFR 264.221(c)).

Buffalo Forage Production

The MHA Nation raises buffalo as an economic enterprise. Currently, forage for the herd of 650 animals is insufficient and MHA Nation must buy bales of forage from other sources to feed the herd during the winter.

The primary land use within Section 19 and 20 of the project area is intensive dry land farming (e.g., cereal row crops – barley and wheat), which may include cattle grazing in the late fall. The MHA Nation proposes to use the remainder of the 279 acres of the project site to raise forage for the buffalo herd to reduce dependency on outside sources.

Therefore, the 279-acres would be converted from a dry land farming crop to a dry land forage crop. The 279-acres would be seeded initially with oats and crested wheatgrass and the crop would be swathed and baled. Subsequently, the property would be seeded to alfalfa and a mixture of grasses and the crop would be swathed and baled. Buffalo would not be grazing within the property; the forage would be hauled to lands where the Tribal herd is being managed.

Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, BIA would accept the 469-acre project site into trust status, but would not approve MHA Nation's proposal to construct, operate, and maintain a clean fuels refinery. Consequently, the entire 469-acre project site would continue to be used for agricultural purposes similar to those that have been occurring on the property for decades. Additionally, the MHA Nation could decide to use the entire project site to produce feed for their buffalo. Alternatively, the MHA Nation could have the land included in the Farm Pasture Leasing Program as administered by BIA under 25 CFR Part 162.

Under the Farm Pasture Leasing Program, BIA assists Indian landowners in leasing their land for agricultural purposes, through either negotiations or advertisement. BIA typically reviews a negotiated lease for approval, and defers to the landowners' determination that the lease is in their best interest, to the maximum extent possible. If a lease is granted on the landowners' behalf, BIA will attempt to obtain a fair annual rental and ensure that the use of the land is consistent with the landowners' wishes.

Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, BIA would not accept the 469 acres into trust status; however, the MHA Nation would construct the clean fuels refinery on this property (e.g., without the trust status). Under this alternative, the MHA Nation would not need BIA's approval for the clean fuels refinery, but the Project would need to obtain required permits from the EPA and others. All of the effluent discharge alternatives will be considered for this alternative.

Alternative 4 — Modified Proposed Action

Under this alternative, BIA would accept the 469 acres into trust for the construction and operation of a refinery; however, the design would be modified from the MHA Nation's proposal. The refinery would be reconfigured to minimize impacts to the jurisdictional wetland; use of tanks instead of ponds for potentially contaminated (oily) stormwater and contaminated process waste water, and; use of a sanitary collection tank or sanitary waste treatment plant instead of a leach field. The refinery would continue to be regulated as a RCRA large quantity generator. The refinery would be redesigned so that tanks and tank systems are used. When the refinery discharges are regulated by an NDPES permit, and the RCRA WWTU exemption applies, the refinery would not be regulated as a RCRA TSD Facility. The proposed septic tank for employee wastewater would also be replaced with either a small treatment plant or wastewater would be trucked to a municipal wastewater treatment plant.

The revised design reduces impacts to the jurisdictional wetland by changing the locations of the utility building, main electrical substation and sulfur plant as shown in Figure 2-15. The ditches containing the uncontaminated stormwater from the western part of the site would be directed to one or two collection points adjacent to the east side of the swale. This water would cross the swale via an underground pipe consistent with minimal impact. The final design would impact less than 0.1 acre of the jurisdictional wetland due to two roadway crossings. This redesign eliminates the "future expansion" area shown in Figure 2-7.

The modification of the facility design would change the NPDES discharge permit outfalls: New Outfalls 002a and 003 would be added.

- Outfall 001 uncontaminated stormwater
- Outfall 002 discharges from the process (refinery) wastewater treatment unit
- Outfall 002a potentially contaminated (oily) stormwater, treated as needed
- Outfall 003 employee wastewater treatment plant

The potentially contaminated (oily) stormwater holding pond and final effluent holding ponds would be replaced with a tank system to meet specific regulatory requirements under RCRA (Figure 2-16). An additional NPDES outfall (002a) would be provided for the discharge of the potentially contaminated (oily) stormwater from the tank system. The potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks located between the process units and the evaporation pond. These are underground shallow tanks to accommodate gravity filling following the site gradient. The tanks would be made of double wall steel or equivalent in compliance with 40 CFR 265 Subpart J. The total capacity of the tanks is 15,000 barrels, but multiple tanks would be used to minimize individual tank size and the risk of potential leakage. If there is leakage, then only one tank would be taken out of service for repair, leaving all the others in service. The tank system would be sized to contain the maximum stormwater flow predicted to be 5 inches/24 hour. Normal flow is 18 inches/year (0.05 inches/24 hour average). The holding tanks would provide the surge capacity to hold the stormwater for testing before its release to the release tanks, or to the process wastewater treatment unit, if required. The release tanks would be located near the surge tanks, but the piping would be segregated for release control. After testing, the water in the release tanks would either be recycled to process the wastewater treatment unit or be released to Outfall 002a.

Process (refinery) wastewater would be treated in the wastewater treatment unit as described in Alternative 1; however, rather than being stored in holding ponds, it would be sent to a series of final effluent release tanks prior to discharge from Outfall 002. This wastewater could be tested prior to release and if it does not meet discharge limits it could be recycled back to the wastewater treatment unit for further treatment.

The uncontaminated stormwater is surface drainage outside the paved and curbed process areas. This water would be conveyed in surface ditches to the evaporation pond for holding and testing prior to release to Outfall 001, used for recycling, or to maintain capacity in the firewater ponds. The average flow here is based on 18 inches/year of precipitation, but the evaporation pond would be large enough to hold the 5 inches/24 hour 100 year maximum. The normal operation is to recycle this water (after testing) to the plant, and release any excess (up to the 55 gpm maximum) to Outfall 001. The average recycle rate is 30 gpm along with 10 gpm from the water wells for the total refinery average water needs. Other surface stormwater outside either those areas that are paved and curbed or within process areas would continue to follow natural contours.

Sanitary wastewater (e.g., employee restrooms and showers) would be collected in a dedicated holding tank for removal from the MHA site to a licensed third-party permitted municipal wastewater treatment plant (estimated at 1 truck per day holding 3,750 gallons, average 4,500 gallons per week or 1.2 trucks per week). Alternatively, a modular sanitary wastewater treatment plant would be installed. Treated wastewater would be discharge through Outfall 003 and solid waste removed to an offsite approved landfill site. Lastly, the laboratory waste would be collected in a dedicated holding tank for testing, and removed by truck to a properly permitted off-site disposal site.

Water stored on site would be maximized in the fall to service the plant recycle needs during winter. Shortfalls of water will be made up by the water wells. Water inventories would be at a minimum just prior to the spring thaw.

Figure 2-15 Modified Refinery Layout Plan

Insert Figure 2-15

Back Figure 2-15

Figure 2-16 Wastewater Treatment System Alternative 4

Insert Figure 2-16

back Figure 2-16

Figure 2-17 Hazardous Waste Generation, Alt. 4 Wastewater Treatment Plant

Insert Figure 2-17

back Figure 2-17

RCRA – Generator Classification

Under Alternative 4, the refinery would be classified as a RCRA generator of hazardous waste. As such, it must meet the requirements of 40 CFR 262. The regulations that the refinery would comply with based on its generator classification are identified in Table 2-7.

Table 2-7 Hazardous Waste Generation Classification and Applicable Regulations

Generator	Quantity	Regulation
Large Quantity (LQG)	> 1,000 kg/month (approximately 2,200 lbs) > 1 kg/month acute (approximately 2.2 lbs) > 100 kg residue or contaminated soil from cleanup of acute hazardous waste spill)	All Part 262 Requirements
Small Quantity (LQG)	Between 100-1,000 kg/month (approximately 220-2,200 lbs)	Part 262, Subparts A,B,C (262.34(d) is specific to SQGs);and Subparts E,F,G,H if applicable; and portions of Subpart D as specified in 262.44.
Conditionally Exempt Small Quantity Generator (CESQGs)	<100 kg/month <1 kg/month of Acute Hazardous Waste <100 kg/month of Acute Spill Residue or Soil	Part 261.5

Source: U. S. Environmental Protection Agency 2003a

Solid Waste

Under Alternative 4, solid waste and hazardous waste would be managed as generally described under the proposed Alternative 1. Because of the replacement of the potentially contaminated (oily) stormwater holding pond and effluent holding ponds with a tank system, no pond sludges would be generated. The sludge thickening process would be designed to minimize hazardous wastes generated for offsite disposal by use of a centrifuge with solvent wash or similar process. Figure 2-17 shows how wastes generated from the redesigned wastewater treatment unit would be handled.

RCRA Treatment Storage and Disposal (TSD) Facility Considerations

Under Alternative 4, the refinery would be designed and operated so that hazardous waste is not treated, stored or disposed of at the site. However, the facility could become a RCRA TSD if an NPDES permit is not obtained (and the "wastewater treatment unit" exemption at 40 CFR 264.1(g)(6) does not apply), and/or the wastewater treatment unit is not designed and operated on a continuous basis according to the requirements for Aggressive Biological Treatment Units (40 CFR 261.31(b)(2)). The facility could also become a TSD in other ways. For example, if hazardous wastes are stored for greater than 90-days at the refinery, or if certain waste streams are combined or exceed the toxicity characteristic, the facility would become a TSD. If the facility becomes a TSD, it would be required to obtain a RCRA TSD permit from EPA. A TSD permit would significantly increase the regulatory requirements for the proposed refinery project (40 CFR Part 264 including RCRA corrective action requirements). This would include applicable construction requirements (including double liners) for all hazardous waste surface impoundments (264.221(c).

Alternative 5 — No Action

Alternative 5 is the no action alternative. Under this alternative, BIA would not accept the 469 acres into trust status and EPA would not issue an NPDES permit for the refinery. Thus, the refinery would not be constructed under this alternative. The MHA Nation would continue to own the property outside of trust status. For this analysis, BIA assumed the entire 469-acre project site would continue to be used for agricultural purposes similar to those that have been occurring on the property for decades. Thus, this alternative serves as the baseline for comparison of the other action alternative.

Effluent Discharge Alternatives

As noted earlier, four effluent discharge alternatives were developed for the three refinery construction alternatives: Alternatives 1, 3 and 4. There may be modifications to the design to accommodate requirements of the discharge alternative, such as adding additional storage capacity to holding ponds or tanks.

Alternative A - Proposed Effluent Discharge Action

Under this alternative, the MHA Nation would obtain an NPDES permit for the discharge of effluent from the refinery. There is a difference in the number of outfalls and the discharge from those outfalls for each of the construction Alternatives.

Under Alternative 1, there would be two NPDES permitted outfalls. One would be for uncontaminated (non-oily) waste water which originates from two sources, the boiler system and stormwater. Waste water from the boiler system (boiler blowdown) will be routed to the WRP for treatment and recycling back to refinery processes (Figure 2-3 and Figure 2-4). This waste water will be segregated from the contaminated (oily) waste water to minimize production of hazardous sludge. Uncontaminated (non-oily) stormwater will be collected from non-process areas of the refinery and routed to a 7.48 million gallon evaporation pond. Waste water from the evaporation pond would be used as makeup water for the fire water system (two reservoirs of 2.25 million gallons each) as needed, recycled back to the refinery processes or when necessary discharged through an NPDES permitted outfall.

The other NPDES permitted outfall would be for potentially contaminated (oily) waste water. Wastewater collected from process operations (primarily the Sour Water Stripper) would be routed directly to the WWTU for treatment and then directed to two effluent holding ponds (700,000 gallons each/1.4 million gallons total). Potentially contaminated (oily) stormwater will be collected from process areas (i.e. loading area, tank farm (Figure 2-5) and routed directly to a 1.4 million gallon holding pond. Depending on quality, the waste water from the holding pond would be directed to the two effluent holding ponds described above or sent to the WWTU for treatment and then into the effluent holding ponds. The effluent from the holding ponds would be recycled back to refinery processes as needed, or discharged through a permitted NPDES outfall in this alternative. All waste water treatment processes would be proven technology and would be designed to meet quality requirements for recycling back to refinery processes and NPDES discharge permit requirements

Under Alternative 4, there could be four NPDES discharge permitted outfalls: Outfall 001 for uncontaminated stormwater, Outfall 002 for wastewater treatment unit, Outfall 002a for potentially contaminated (oily) stormwater, treated as needed, and Outfall 003 for employee wastewater treatment plant.

The potentially contaminated (oily) stormwater holding pond and final effluent holding ponds would be replaced with a tank system to meet specific regulatory requirements under RCRA (Figure 2-16). An additional NPDES outfall (002a) would be provided for the discharge of the potentially contaminated (oily) stormwater from the tank system. The potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks located between the process units and the evaporation pond. These are underground shallow tanks to accommodate gravity filling following the site gradient. The tanks would be made of double wall steel or equivalent in compliance with 40 CFR 265 Subpart J. The holding tanks would provide the surge capacity to hold the stormwater for testing before its release to the release tanks, or to the process wastewater treatment unit, if required. The release tanks would be located near the surge tanks, but the piping would be segregated for release control. After testing, the water in the release tanks would either be recycled to process the wastewater treatment unit or be released to Outfall 002a.

Process (refinery) wastewater would be treated in the wastewater treatment unit as described in Alternative 1; however, rather than being stored in holding ponds, it would be sent to a series of final effluent release tanks prior to discharge from Outfall 002. This wastewater could be tested prior to release and if it does not meet discharge limits it could be recycled back to the wastewater treatment unit for further treatment.

The uncontaminated stormwater is surface drainage outside the paved and curbed process areas. This water would be conveyed in surface ditches to the evaporation pond for holding and testing prior to release to Outfall 001, used for recycling, or to maintain capacity in the firewater ponds. The normal operation is to recycle this water (after testing) to the plant, and release any excess (up to the 55 gpm maximum) to Outfall 001. The average recycle rate is 30 gpm along with 10 gpm from the water wells for the total refinery average water needs. Other surface stormwater outside either those areas that are paved and curbed or within process areas would continue to follow natural contours.

A modular sanitary wastewater treatment plant could be installed. Treated wastewater would be discharge through Outfall 003 and solids waste removed to an offsite approved landfill site. Lastly, the laboratory waste would be collected in a dedicated holding tank for testing, and removed by truck to a properly permitted off-site disposal site.

Alternative B —Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, wastewater would be treated in the WWTU and then stored in the ponds on the west side of the facility or in release tanks. The MHA Nation would discharge water as described for the proposed project action during times when irrigation is not possible. During the growing season when saturated soil conditions do not exist, the refinery could use treated wastewater to irrigate trees and forage on the project site. Thus, this alternative is a modification of Alternative A. With this alternative, the MHA Nation could either irrigate when possible or discharge treated wastewater. As in Alternative A, wastewater would be discharged as needed from an outlet into the wetland in the northwest corner of the project site (Figure 2-7).

The refinery wastewater is considered to be (by definition) a solid waste under RCRA. As such, all wastewater proposed to be used for irrigation should be treated to meet appropriate standards to protect human health and the environment. In addition, unless the wastewater is treated sufficiently, it will continue to be considered a solid waste containing hazardous waste constituents, and RCRA corrective action requirements could apply for the irrigated land parcel.

Alternative C — Effluent Discharge to an Underground Injection Control (UIC) Class I Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTU to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost underground source of drinking water (USDW). Thus, the well would place effluent in porous formations of rocks or a deep aquifer that is not identified as existing or future USDWs. Because injection wells have the potential to inject contaminants that may cause underground sources of drinking water to become contaminated, the UIC Program prevents contamination by setting minimum requirements. These requirements typically include contamination prevention by keeping injected fluids within the well and the intended injection zone, direct or indirect injection into an USDW, or otherwise adversely affect public health. The siting of the UIC well and the construction, operation, maintenance, monitoring, testing, and closure of the well will consider these minimum requirements.

Alternative D — No Action

Under this alternative, EPA would not issue any permits for the discharge of effluents from the proposed refinery. This includes permits for NPDES regulated discharges, discharges to a Class I non-hazardous UIC well, and discharges of the septic system to a leach field. Thus, no discharges of water of any kind from a refinery would be permitted under this alternative.

Summary of RCRA Applicability

The design and operation of the facility would play an important role in determining which environmental permits would be needed. This is discussed briefly below and in more detail in the “Discussion of Regulatory Applicability” document (EPA, May 2006).

A RCRA TSD Facility permit would be required for Construction Alternatives 1 and 3, because refinery would be constructed which generates hazardous waste and the use of surface impoundments instead of tanks. A RCRA TSD permit would also likely be needed for any of the refinery construction alternatives combined with Effluent Discharge Alternatives B and C, because all or part of the wastewater would not be discharged in accordance with an NPDES permit. Based on the preliminary design for the facility, the only alternatives combination which would not need a TSD permit is Alternatives 4 and A. The final determination of RCRA applicability would be based on the final design and the TSD permit application for the facility. The main factors affecting RCRA applicability are listed below:

Alternatives 1, 3

- Alternative 1, 3 and A: Surface impoundments would not meet the RCRA definition of tanks or tank systems;
- Alternative 1, 3 and B: Surface impoundments would not meet the RCRA definition of tanks or tank systems, and irrigation (land application) would not likely be covered under the WWTU because some of the wastewater would not be discharged under an NPDES permit under CWA; and
- Alternative 1, 3 and C: Surface impoundments would not meet the definition of tanks or tank systems, and UIC disposal would not likely be covered as the WWTU exemption applies if discharges are subject to an NPDES permit under CWA.

Alternative 4

- Alternative 4 and A: A RCRA TSD Facility permit would not be required due to the use of tanks and tank systems in the WWTU in conjunction with an NPDES discharge permit as this meets the requirements for the WWTU exemption;
- Alternative 4 and B: Irrigation (land application) would not likely be covered as the WWTU exemption, because some of the wastewater would not be discharged under an NPDES permit under CWA; and
- Alternative 4 and C: UIC disposal would not likely be covered as the WWTU exemption applies if discharges are subject to an NPDES permit under CWA.

Alternatives Considered but Eliminated from Detailed Analysis

Several alternatives were considered for this analysis, but were eliminated from detailed study for various reasons. These alternatives are listed below. The reasons they were excluded from further consideration also are described.

Alternative Considered	Use of local light sweet crude oil as a feedstock
Reasons Considered	This alternative was specifically developed to respond to the MHA Nation's desire to refine oil that it may extract from under the Fort Berthold Reservation. It also would have accepted other local supplies of crude oil.
Reasons Dropped	This alternative was dropped from detailed analysis because of technical considerations. First, the local supply of light sweet crude oil is declining and the trend is not expected to change in the future. The refinery needs a dependable source of oil for at least 20 years. Additionally, the locally available crude oil has several disadvantages that the refinery would have to overcome. Processing would require desalting of the oil. This process uses a substantial amount of water (equivalent to about 5 percent of the crude feed), and local supplies of water for the refinery are limited. Also, the refinery would need an injection well to dispose of the brine that the desalting process would generate. Finally, the local crude would produce fewer aromatics and less diesel. It also would have more selenium, other metals, and bottoms requiring disposal.

Alternative Considered	Alternative to completely avoid wetlands with pumping.
Reasons Considered	This alternative was considered to minimize dredging and filling jurisdictional waters of the U.S. including wetlands.
Reasons Dropped	The shift of the facility to the east and slightly south as designed would encroach upon the safety zones for the edge of property, railroad, and existing homestead. It would require additional excavation to achieve acceptable surface water drainage and capture. The drainage would not be all in one direction as presently designed so a pumping system would need to be installed to move captured water to the treatment facility. The cost for the facility construction would in-

crease by approximately $2,000,000 as there would be additional infrastructure required; more excavation to achieve acceptable surface water drainage, and a surface water capture system and pumping to the water treatment unit. There would also be increased operational costs for the facility from the pumps.

When considering the need for acceptable surface water drainage, the use of pumps or alterations of existing gradient would increase the potential for adverse environmental consequences because of pump failure, breaching of drainage capture, or ponding of potentially contaminated water in unprotected areas. This alternative would also limit future expansion of the facility.

Alternative Considered	Discharge of Effluent from the Waste Water Treatment Plant to a Wetland Treatment Unit Constructed on the Project Site.
Reasons Considered	This alternative was considered to provide additional treatment of nutrients and hydraulic buffering of the effluent before it was discharged into the existing wetland on the project site.
Reasons Dropped	This alternative was dropped from detailed evaluation because of uncertainties regarding whether there would be a significant benefit to the existing wetland. Although constructed wetland can attenuate flow, it is unclear if attenuation would benefit the existing wetland. From a water quality standpoint, the wastewater treatment unit would already meet the permit limits at the end of the pipe before water is discharged into the existing wetland. Thus, having a constructed unit would not change the water quality permit limits that need to be met. Pond/wetland treatment systems provide little to no treatment in the winter because of low temperatures. Treatment performance of the constructed wetland decreases over time without substrate replacement or removing vegetation every couple of years. There would also be additional construction costs and siting difficulties in locating another treatment unit on the site with gravity flow from the existing treatment units.

Alternative Considered	Alternative to minimize impact to wetlands by moving ponds east of the wetland.
Reasons Considered	This alternative was considered to minimize dredging and filling jurisdictional waters of the U.S. including wetlands.
Reasons Dropped	Reducing the fill of the wetland by 100 feet by moving the water treatment unit and ponds to the east of the swale would encroach upon the safety setbacks for the tank farm (240 foot separation) and property line (200 foot separation). This alteration would cost approximately $930,000 more to construct than the proposed alternative as two high capacity trash pumps with pump houses and associated piping would be needed ($588,700), as well as 80,000 cubic yards of additional excavation ($340,000). There could be an increase in potential adverse environmental consequences from captured surface water pump failure, breach of drainage capture systems, or ponding of potentially contaminated water in unprotected areas. There would also be increased operational costs for the facility from the pumps.

Alternative Considered	Discharge of the Waste Water Treatment Plant Effluent to the East Fork of Shell Creek stream channel north of Highway 23.
Reasons Considered	This alternative was considered to move the point of discharge out of the existing on-site wetland to reduce hydraulic impacts and changes in function to the 11 acre wetland in the northwest corner of the site.
Reasons Dropped	This alternative was dropped from detailed evaluation because the Tribes would prefer not to discharge directly offsite onto land which the Tribes do not own. There would be additional costs including construction of a 1-2 mile effluent pipeline ($200,000/mile), pipeline easement and operations/maintenance.

Alternative Considered	Pipe the Waste Water Treatment Plant Effluent to a Discharge Point in Lake Sakakawea west of Parshall (about 19 miles) or in the Lower Portion of East Shell Creek (about 15 miles).
Reasons Considered	This alternative was considered to reduce hydraulic impacts and changes in function to the wetland in the northwest cor-

	ner of the site.
Reasons Dropped	This alternative was dropped from detailed evaluation because of the substantial additional costs for constructing and maintaining the pipeline (15 to 20 miles). Also, the MHA Nation would have to acquire extensive rights-of-way within which to construct the pipeline. Preliminary estimates for the pipelines suggest the costs of construction would be slightly more than $1 million per mile. The estimate includes construction of 15 to 20 miles of pipeline, lift station(s) and easement purchases). Maintenance costs the MHA Nation would incur would be in addition to this cost.

Alternative Considered	No Effluent Discharge, Storage and Irrigation
Reasons Considered	This alternative was considered to reduce hydraulic impacts and changes in function to the wetland in the northwest corner of the site and the need for a NPDES permit.
Reasons Dropped	This alternative was dropped from detailed evaluation because of the technical limitations in meeting a no flow situation to be in compliance with CWA regulations.

Summary of Environmental Consequences

The matrix presented on Table 2-8 summarily compares the effects to the affected environment that would occur by implementing each of the four alternatives considered in detail for the MHA Nation's proposed fee-to-trust and clean fuels refinery and buffalo forage project.

Summary of Mitigation Measures:

See Chapter 4 Selected Plans and Mitigation Measures.

Agency-preferred Alternative

BIA

BIA has not selected a preferred alternative at this time.

EPA

EPA has not selected a preferred alternative at this time.

Table 2-8 Summary of Environmental Impacts by Alternative and Resource

Insert summary table here, 11X17 paper, approx 4 pages